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A Study of Curriculum and Program Planning for Vocational-Technical Education in Massachusetts

June, 1988

Division of Occupational Education
Massachusetts Department of Education

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Prepared by:

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The Commonwealth of Massachusetts
Department of Education

1385 Hancock Street, Quincy, Massachusetts 02169

M E M O R A N D U M

TO: Individuals Interested in Vocational Education

FROM: David F. Cronin DFC
Associate Commissioner
Division of Occupational Education

SUBJECT: A Study of Curriculum and Program Planning for Vocational-Technical Education in Massachusetts

DATE: September 6, 1988

On January 5, 1988, the Massachusetts Legislature enacted Chapter 731, An Act To Improve Vocational Education and the Governor signed this Act into law on January 12, 1988. Chapter 731 amends Chapter 74 of the General Laws of the Commonwealth to update a number of sections of Chapter 74 and to initiate new programs.

In section 11 of Chapter 731, the Department of Education is directed to conduct a study to develop a long range plan for curriculum and program planning for vocational-technical education. This study has been conducted by the Division of Occupational Education during the past six months and we have drawn upon a significant collection of data and information available from Division research, third party evaluations of vocational-technical education, and reports from other state agencies. Several recent national research reports were also reviewed for implications that relate to the Massachusetts economic and education scene. The findings from the extensive needs assessment conducted for the development of the Massachusetts Plan for Vocational Education for Fiscal Years 1989-1990 were a major source for this Chapter 731 study.

I am pleased to send this copy of the study report to you. Research, evaluation and planning for vocational-technical education will continue at both the state and local level. For the immediate future, the 1986 Strategies Conference, the State Plan for Vocational Education for Fiscal Years 1989-1990, and the Chapter 731 Study of Curriculum and Program Planning for Vocational-Technical Education in Massachusetts will provide the direction for continued advancements in public vocational-technical education in the Commonwealth.

If you have any questions or comments about this study, please contact the Bureau of Planning, Research, and Evaluation (770-7381), Division of Occupational Education, 1385 Hancock Street, Quincy, MA 02169.

/mtk
enclosure

A Study of
Curriculum and Program Planning
for
Vocational-Technical Education
in Massachusetts

June, 1988

Division of Occupational Education
Massachusetts Department of Education

A STUDY OF VOCATIONAL-TECHNICAL CURRICULUM AND PROGRAM PLANNING

On January 5, 1988, the Massachusetts Legislature enacted Chapter 731, An Act To Improve Vocational Education. The Governor signed this Act into law on January 12, 1988. Chapter 731 amends Chapter 74 of the General Laws of the Commonwealth to update a number of sections of Chapter 74 and to initiate new programs.

Section II of Chapter 731 declares that:

> The department of education is hereby authorized and directed to conduct a study to develop a long range strategy plan for vocational-technical curriculum and program planning to prepare vocational-technical students for the changing demands in the workforce in the Commonwealth. The study shall include an analysis and review of the current vocational-technical programs offered in the Commonwealth and shall determine the need, if any, for establishment of post secondary vocational-technical programs in addition to those offered at the community college level.

This study has been conducted by the Division of Occupational Education, Massachusetts Department of Education and has drawn upon a significant collection of data and information available from Division research, third party evaluations of vocational-technical education, and reports from other state agencies. Several recent national research reports were also reviewed for implications that relate to the Massachusetts economic and education scene. The sources and resources for this study are listed as Appendix A.

PREFACE REMARKS

Serving a Diverse Constituency

Any study of programs and curriculum in vocational-technical education must be preceded by the recognition that the individuals served by this enterprise represent a diverse constituency. Differences in age, in occupational interests and in ability require that a variety of occupations be included in program offerings that are organized in flexible formats to address the learning needs of an assortment of enrollees. In Massachusetts, vocational-technical education serves high school students and adults in schools and in colleges that offer programs based upon time sequences that range from several weeks to four years.

Meeting Labor Market Needs

The diversity in both the constituency and the delivery system for vocational-technical education demands that both a present and a future labor market orientation be included in program planning and curriculum development. The effective utilization of program advisory committees is an essential element in the quest for validation of present and future labor market

orientation. In Massachusetts, over 6,000 individuals representing private sector employers presently serve as members of program advisory committees for Chapter 74 programs. It is not enough to prove that a program and curriculum match the occupational competencies that are presently required; some assessment of the foundation skills that will be needed for a successful career must be included for high school students and for postsecondary program enrollees. Adult training and retraining, with basic skills as a prerequisite, will more likely focus on the present skill needs of the labor market.

Applied Learning: The Common Ground

Applied learning is an answer to two critical challenges faced by public education: (1) how do we meet the learning needs of between forty (40) percent and sixty (60) percent of our students who succeed more often when moving from concrete application to abstract concept? and (2) how can we ensure a future orientation for career preparation during a time that includes considerable uncertainty of future skill requirements in specific occupations? While vocational-technical education has successfully provided the answer to these questions for hundreds of thousands of students over many years in Massachusetts, the twin factors of increased drop-out/'tuneout' rates in 'regular' education and increased rates of change in occupations calls for

renewed attention to the applied learning process. In fact, for at least a decade, both mathematics and science educators have advocated increased use of applications in their teaching strategies. The ability of students to acquire problem solving skills and to be able to generalize the particular knowledge to new learning situations are goals shared by all educators. Applied learning curricula can be the bridge to success for many students in school and in their careers.

I. Analysis and Review of Current Vocational-Technical Programs in Massachusetts

Placement and follow up studies are the primary research techniques used to measure the effectiveness of vocational-technical programs. The Division of Occupational Education has conducted or funded a number of these studies in recent years and the Division has also directed a study of related instruction (1985) and sponsored a year long analysis of vocational-technical education culminating with the Strategies Conference of October, 1986.

This study will draw upon these research findings, labor market research available from the Division of Employment Security (DES) and data prepared by the Center for Labor Market Studies (Northeastern University) for the State Occupational Information Coordinating Committee.

Chapter 74 program evaluations are conducted by staff of the Division of Occupational Education located at the Department's six Regional Education Centers. These extensive evaluations achieve the accountability functions included in Chapter 74 of the General Laws and focus on the improvement of programs of vocational-technical education. The results of these evaluation efforts are a primary source for both individual school districts and for statewide program planning.

A. Programs Offered - Secondary Education

A total of 40,573 secondary school students were enrolled during school year 1986-1987 in Chapter 74 programs that represented a total of 76 occupations. Actually, 67 percent of these high school students were enrolled in just 13 occupational areas of study, 81 percent in 20 areas, and 90 percent in just 30 occupational subject areas.

Appendix B lists the Chapter 74 Enrollment by occupational field of study for grades 9-12 during the 1986-87 school year.

Advances in the application of technological developments, especially microelectronics, have impacted the vast majority of these occupations. The nature of the impact ranges from evoluation (e.g. service occupations) to revolution (e.g. automotive, electrical, electronics, computer programming). Some fields retain an image of stability for several years while the forces of change (e.g. competition, exchange rates, new materials, etc.) combine at a given moment to trigger rapid transformation of job content and work procedures.

1987 Chapter 74 Enrollments

Grades 9-12

Top Twenty Programs

Carpentry	3248
Automotive Mechanics	3166
General Merchandise	3145
Electrical	2949
Machine Shop	2244
Culinary Arts	2175
Electronics	1966
Graphic Arts	1828
Body and Fender Repair	1770
Drafting	1570
Computer Programming	1367
Cosmetology	1350
Plumbing and Pipefitting	1078
Health Aide	884
Nursing Assistant	882
Metalworking	829
Commercial Art	809
Woodworking	787
Painting and Decorating	745
Sheet Metal	672

The Division of Employment Security (DES) issued a new publication in January, 1988:

Ninety Jobs For The Nineties - Your Guide to Growing Job Opportunities in Massachusetts. Ninety occupations were selected based on their projected growth rate and most occupations selected have a growth rate above the statewide average of 15.8 percent.

A cross analysis of these two data sources reveals that vocational-technical education programs on the secondary school level in Massachusetts are exceptionally well situated to prepare students for occupations with a future. Eighteen (18) of the top twenty (20) Chapter 74 programs appear in Ninety Jobs For the Nineties as occupations with very strong growth rates over the next decade.

There are two 'top twenty' Chapter 74 occupational programs that do not appear in the special DES publication: machine shop and cosmetology. Another DES research report, Occupational Employment Projected Changes 1984-1995 states that:

> Although jobs for machinists and tool and die makers are expected to grow more slowly than average, many openings will arise to replace those workers who retire. Increasing foreign competition, automation, and substitutions of metal parts with plastics and other materials will contribute to limited employment growth.

The Machine Action Project, sponsored by the Commonwealth to examine labor force needs in this occupation in western Massachusetts, revealed that small machine and metalworking firms (less than 50 employees) were experiencing strong labor demand for workers qualified beyond machine operator level. This study also revealed that graduates of western Massachusetts vocational schools had been successfully prepared for a variety of labor market conditions and positions. Finally, it is noted that mechanical engineer and mechanical engineering technician are two of the highest growth occupations (ref. Ninety Jobs For The Nineties) and many vocational technical school graduates from machine shop programs are able to move into this occupational path, including postsecondary education.

Cosmetology presents a different picture. The placement and followup findings from several studies in recent years show evidence of some occupational dissatisfaction on the part of graduates from cosmetology programs. This program appeared on a short list of occupational programs that achieved less than the statewide average for placement from the Division's study of the classes of 1984 and 1985.

The followup studies reinforce this picture with additional evidence of lower than average wage rates from cosmetology.

Cosmetology is an occupation that has higher rates of self employment, higher rates of part-time employment and a higher than average separation rate on a national data basis. Although the Massachusetts Job Outlook report projects a net increase for jobs in this occupation, the data base does not indicate how many of the new jobs will be part-time.

Appendix B to this report lists the enrollment in Chapter 74 programs for the 1986-87 school year.

B. Programs Offered-Postsecondary

Postsecondary level public vocational education programs are offered by local, regional and county school districts, public community colleges and one public junior college. A list of programs offered and the 1987 enrollments is attached as Appendix B. The quality of these programs may be measured by followup studies of program completers and their employers.

The Division of Occupational Education in 1984 conducted a followup study of completers of postsecondary vocational education programs offered by school districts in Massachusetts. This study revealed high levels of satisfaction on the part of the employers of these graduates

and generally positive response from the program completers themselves. Some graduates of health occupation programs described dissatisfaction about the cuts in program length that followed the passage of Proposition 2 1/2.

The Division of Occupational Education has requested community college program completer followup data from the Board of Regents For Higher Education. The last followup report on these programs was submitted in 1983 as the result of a Division funded project to the Board of Regents.

Postsecondary vocational education programs must be highly sensitive to labor market demand to attract and retain students and to justify existence.

C. Need For Additional Postsecondary Programs

One of the more direct conclusions on the subject of the need of future workers to attain higher levels of education is presented in the final chapter of Workforce 2000: Work and Workers for the 21st Century:

> A century ago, a high school education was thought to be superfluous for factory workers and a college degree was the mark of an academic or a lawyer. Between now and the year 2000, for the first time in history, a majority of all new jobs will require postsecondary education. Many professions will require nearly a decade of study following high school, and even the least skilled jobs will require a command of reading, computing, and thinking that was once necessary only for the professions.

Of course, those responsible for vocational-technical education require far greater specificity on education and training needs in order to establish programs. It is essential that the employer community be partners in the design and operation of postsecondary vocational-technical education programs to ensure that the constant need to change the program to keep up to date with workplace conditions will be accomplished.

In Massachusetts, the need for additional postsecondary programs in vocational-technical education will focus on technology dominated occupations and will be designed in partnership with employers in the relevant occupation. Examples include:

Automotive Technology

Machine Technology

Electromechanical Technology

Graphic Communications

Laser Optics Technology

Microelectronics Technology

Computer Service Technology

The continuing employment of a majority (60%) of the Commonwealth's workforce in small * firms (i.e. less than 250 employees) requires the utilization of existing vocational-technical education facilities for the education and training that will be needed to upgrade and advance the skills of new entrants and current workers. It is the employees, supervisors, and managers of these small firms who present a consistent message through their active participation on Chapter 74 program and general advisory committees: We need a strong system of public vocational-technical education with high quality shops, labs, and classrooms to meet the needs of these firms for a qualified workforce.

It is neither economically feasible nor sensible for hundreds of small companies to duplicate the facilities and resources of vocational-technical education. Yet, both prospective and current employees must be trained in current workplace practices.

* This definition is a compromise between the number used by the Small Business Administration (500) and other more narrow definitions.

II. Curriculum Development and Improvement Efforts

Since 1980, the Division of Occupational Education has led a state/local partnership to collect, develop and disseminate quality curricula and to improve curriculum development, management, and evaluation efforts in vocational-technical education in the secondary schools of the Commonwealth. This partnership work has centered around four interconnected activities:

A. Massachusetts Vocational Curriculum Resource Center

The Division of Occupational Education has helped establish and fund a statewide Center since 1980. This project has focused on the collection and dissemination of quality curricula and related materials in print, videotape and software format. The Center has also organized and presented inservice training sessions for school personnel responsible for occupational and vocational education topics including serving special populations, use of instructional technology, and teaching study skills. The Vocational Curriculum Resource Center is linked to a variety of state, regional, and national networks including those that specialize in curriculum coordination in occupational and vocational education. The Center is the workplace for the

participation of Massachusetts in the Vocational-Technical Education Consortium of States (V-TECS), a joint enterprise of 25 states that develop catalogs of task lists, curriculum guides, computerized test banks and other products that serve the curriculum related needs of vocational education. The most recent V-TECS product availability report is attached as Appendix C.

The Massachusetts Vocational Curriculum Resource Center has been the centerpiece of curriculum improvement and dissemination in the state and the Center has been a tremendous resource to teachers, administrators and other school staff as evidenced by the results of an evaluation conducted in 1986 by the Center for Evaluation and Testing at Boston College.

B. Applied Learning Programs

Massachusetts has been a leader in the development of a series of applied (physics, mathematics, communications) curricula through consortia of states organized by the Center for Occupational Research and Development (Waco, TX) and the Agency for Instructional Technology (Bloomington, IN). The Principles of Technology (applied physics) was pilot tested from 1984-1986 and is now taught in 26 high

schools in this state (13 comprehensive, 13 vocational-technical). Applied Mathematics and Applied Communication will be pilot tested in several high schools in Massachusetts during the 1988-89 school year. A proposal to develop a curriculum in Applied Biology/Applied Chemistry has been sent to the states by the Center for Occupational Research and Development.

All of these new curricula are developed in print and videotape format and emphasize the acquisition of 'academic' principles and concepts through classroom and laboratory activities that connect the primarily abstract knowledge to workplace applications. These applied curricula form a foundation of learning that is necessary for students to be successful in work and to acquire more narrow focussed technical education in postsecondary institutions. The 'hoped for' end result is many more students in high school acquiring problem solving skills and other abilities of the mind that will facilitate their movement through a lifetime of new learning in new situations.

This last point is critical since the most widespread agreement among a host of occupational analysts and forecasters in this country is that the labor market entrant of today will face work conditions and requirements that will demand the ability to adapt.

An excellent example of new learning requirements for the workforce of the United States is statistical process control, the approach to quality control that emphasizes the involvement of workers at all levels. The Division of Occupational Education has funded the University of Lowell to develop learning and teaching materials for a program of instruction on statistical process control for students in vocational-technical education. These new materials will be field tested in schools in Massachusetts during the 1988-89 academic year.

C. Competency Based Vocational Education (CBVE)

The Division of Occupational Education has sponsored this statewide curriculum development partnership with vocational-technical schools since 1981. A total of 25 occupational specific curricula have been developed by paired schools and the task lists have been validated by the program advisory committees at each of the 'developer' schools. A statewide CBVE Leadership project provides a central point for printing, dissemination, and technical assistance that is supplied to any requestor. The Division has supported a Mathematics/Science Competency project since 1984 and funded a Communications Competency project since 1986. All of these curricula development activities require

teams of vocational and academic subject teachers. Higher education faculty and workplace representatives also contribute to these efforts. Appendix D lists the products completed to date.

Competency based vocational education has characteristics that address many of the curriculum and instruction needs of students and teachers in vocational education. It is a highly structured process that organizes ingredients of quality vocational education that have been proven over many years. Competency based vocational education concentrates on identification of the skills and knowledge required for success in the present condition of specific occupations. A future orientation will be a necessary complement in the structuring of a total instructional program to ensure the development of problem solving aptitudes.

A third party evaluation of Competency Based Vocational Education projects will be conducted between September, 1988 and June, 1989.

D. Technical Committees

Technical committees are a valuable resource in developing and revising curricula in vocational-technical education in Massachusetts. Each technical committee also provides a statewide perspective on skill and knowledge requirements for a variety of jobs in a particular occupation. The impact of technology on work operations can be assessed more accurately with the insight of these committees.

The membership of these technical committees, which have been formed in consultation with the State Council on Vocational Education, consists of (a) employers from a relevant occupation, (b) representatives of trade or professional organizations, and (c) organized labor, where appropriate.

Two technical committees have been appointed by the State Board of Education: Automotive Technology and Electromechanical Technology. The Automotive Technical Committee has continued as a standing committee and this group, assisted by Division staff and five teachers, has accomplished several tasks and made additional contributions:

1. Validation of statewide competency list for secondary school vocational-technical automotive programs;

2. Survey of equipment, tools, and instructional aids available and necessary for effective instruction;

3. Planning and operational support for Automotive Technology Day on May 19, 1988 for automotive teachers, administrators, and counsellors.

4. Two weeks of professional improvement training for automotive teachers at the Ford, General Motors, and Volkswagen Training Centers;

5. Donation of six new cars from Volkswagen of America, Inc. to Massachusetts vocational-technical schools;

6. Two significant donations of equipment, tools, and engines from Ford Motor Company;

7. Videotape contributions from Arrow Automotive industries for both training and student recruitment;

8. Encouragement and support for the program certification process of the National Automotive Technicians Education Foundation.

The Electromechanical Technology Committee was appointed by the State Board in December, 1986 and this committee has constructed a competency list for new programs in electromechanical technology that includes attention to fiber optics, laser, and robotics technology. This Committee has agreed to serve as a statewide resource for the teachers who are now developing a full curricula in this high demand set of occupations.

Drafting and graphic communications (printing) have been selected as the occupations for two new technical committees that will be operational as of September, 1988.

E. Programs and General Advisory Committees

Advisory committees are intended to serve a vital function in the planning, operation, and evaluation of Chapter 74 vocational-technical education programs. Each Chapter 74 program must have an advisory committee with membership from business, industry and labor representative of the occupation and from parents and students. Each school that operates one or more chapter 74 programs must have a General

Advisory Committee that must include the chairman of each program advisory committee.

Advisory committees are making significant contributions to the quality of vocational-technical education in Massachusetts:

- **General program planning.** Advisory committees help school measure trends in the local labor market. They identify new programs that are needed as well as programs that have become obsolete. They help schools set priorities for allocating their limited resources.

- **Curriculum and instruction advisement.** Advisory committees identify new or developing fields in certain occupations, visit shops to demonstrate specialized skills, and validate tasks to help students become more competitive.

- **Equipment and facilities advisement.** The foresight and generosity of advisory committees have kept Massachusetts vocational-technical programs in the vanguard of new technology in many occupations. On a statewide basis, advisors have donated millions of dollars worth of industrial equipment and supplies to vocational-technical schools.

- **Student recruitment, career guidance, and placement services.** Advisors employ vocational-technical students as co-op placements and as graduates, and they direct students to other potential employers. Advisors often serve as judges for student organization competitions, and they give valuable prizes to top graduates.

- **Professional development.** Advisors help instructors stay current with technology. Some offer summer jobs to teachers; others sponsor inservice workshops.

- **Community public relations.** Advisory committees represent the school among the business community. They are often the school's most influential advocate with the school committee, and their advice is often the most effective way to institute change.

- **Program evaluation.** Advisory committees work with administrators to develop criteria for determining when vocational-technical programs should be scaled down or terminated. They also make suggestions for modifying exploratory programs to attract top-quality students.

Key to the success of any vocational-technical advisory committee is commitment-not only of the committee members themselves, but also of the school administrators who set the tone for cooperative ventures, and above all, of the teachers, whose mission it is to prepare students to enter the work force.

The Division of Occupational Education sponsored the development of a Guide to the Effective Utilization of Vocational Technical Advisory Committees. This Guide was disseminated in training sessions across the state in September, 1987.

III. Meeting the Challenges/Opportunities

The immediate challenges/opportunities for public vocational-technical education in Massachusetts are:

- to provide learning experiences for secondary school students that range from 'rescue' operations for students with deficient basic skills to advanced instructional programs for students bound for engineering and other technical degree programs;

- to focus academic and occupational competencies on the foundation skills and knowledge that will enhance students' ability to develop and refine advanced learning throughout their careers;

- to connect learning experiences on the secondary school level to previous grades (especially through career and technology education) and to postsecondary programs (especially through articulation with community colleges and other institutions of higher education);

- to continue to serve a variety of populations, including at risk populations, in exploratory, high school, and adult training and retraining;

- to involve individuals, associations, and institutions affected by vocational education in the planning and operation of these programs;

- to secure funding sufficient to meet the vocational-technical education and training needs of Massachusetts citizens on the secondary, postsecondary, and adult levels. A particular and strong challenge will be the financing of adult training programs for unemployed and underemployed individuals, especially in light of limited federal funding.

- to overcome inadequate vocational guidance and occupational information services; in part by inviting workplace representatives to serve as 'tutors' and 'mentors'.

- to update, upgrade, and maintain shop and laboratory equipment in high demand occupations to ensure appropriate learning opportunities for secondary, postsecondary, and adult populations.

- to prepare occupationally competent individuals to meet the challenges and reap the rewards of a teaching career in vocational-technical education.

- o to offer staff development opportunities that meet the occupational and the pedagogical needs of teachers and other staff in vocational-technical education.

- o to increase and expand partnership programs amongst vocational-technical education, private sector institutions and other public and private agencies or associations.

- o to adopt, adapt, develop, and renew both competency based curricula and applied learning programs.

An extensive assessment of need was conducted over an 18 month period (July 1986-December 1987) and was the basis for the development of the State Plan for Vocational Education for Fiscal Years 1989-1990. This State Plan was submitted in late April, 1988 to the United States Department of Education for approval. The pages most relevant to this study are attached as Appendix E.

The State Plan for Vocational Education for Fiscal Years 1989-1990 contains many findings and many proposed activities that relate to the objectives of this study for Chapter 731. The reader is referred specifically to the findings and the activities listed on pages 60-62, 69, 71-78. These sections of the Plan focus upon curriculum, program, and personnel needs including the need to develop new programs in areas such as electromechanical technology and the need to upgrade the

equipment and related elements in vocational-technical education, especially for technology dominated occupations.

The utilization of public vocational-technical education by secondary school students, students enrolled in special 'after school' and summer programs, postgraduate students, enrollees in adult training and retraining programs, and enrollees in postsecondary programs places a substantial strain on the equipment and supplies for those programs. The renewal of these elements and the modernization of these and other elements of a program are critical to the maintenance of quality. One promising prospect in the equipment domain is the emergence of quality trainers in some occupational areas: automotive technology (mechanics) and machine technology are prime examples. The feasability of these trainers to effectively simulate conditions in the workplace have been considerably enhanced by advances in the application of microelectronics. Vocational-tehcnical educators must weigh several factors in reaching the appropriate decisions on purchase, lease, loan, or donation of equipment. These factors include (a) relationship to current and projected labor market conditions; (b) placement records and followup study results by occupation; (c) equity of salary, placement and advancement opportunities by gender for the occupation; (d) input of private sector representatives on advisory committees; (e) potential for equipment to actually meet the learning needs of a variety of students as <u>explicitly</u> detailed in an annually updated competency based curriculum; (f)

immediate and long term training provided by vendors; and (g) alternatives including cooperative education experiences, interactive videodisc technology, and short term equipment loans by employers.

Research and evaluation of vocational-technical education in Massachusetts will continue at both the state and local level. For the immediate future, the 1986 Strategies Conference, the State Plan for Vocational Education 1989-1990, and the Chapter 731 Study of Curriculum and Program Planning for Vocational-Technical Education in Massachusetts, will provide the direction for continued advancements in public vocational-technical education in the Commonwealth.

Special Focus On Equity

Equity considerations are extremely important for education and the economy in general and especially critical for vocational-technical education. The changing demographics of the workforce as highlighted in recent national reports on the economy demand even greater attention and action on the elements of the education and employment systems that impact opportunities for females and minorities to succeed in the workplace. Vocational-technical education must continue to advance a leadership position on these equity issues as this set of educational programs articulates with other sectors of public education, with the parents of present and potential students, and with the employer community.

The Massachusetts State Plan for Vocational Education for Fiscal Years 1989-1990 devotes considerable attention to equity concerns as outlined in the Plan's goals and objectives (pp. 10-15) and in greater detail throughout the activities chart (pp. 28-49).

It is important to emphasize three features of these proposed activities to enhance equity in vocational-technical education:

1. The need to considerably increase and expand career exploratory programs for all students in grades K-12, but especially for female students and for economically disadvantaged students.

2. The need to involve parents of these students in the effort to effectively communicate career and occupational information.

3. The need to involve employers in the development and presentation of quality occupational information to students and parents and to continue analysis and action on equity issues related to placement of program completers.

APPENDIX A

Sources/Resources for Study

SOURCES

Massachusetts Industrial Employment:
Projected Changes in 1984-1995

Massachusetts Occupational Employment:
Projected Changes 1984-1995

Selected Occupational Wages In Manufacturing (DES)

Department of Labor and Industries: Wage Rates

Placement Study: Classes of 1984, 1985

Followup of Vocational School Graduates/Employers'
Satisfaction Study
(Abt Associates; 1987)

Special Followup Study: Completers of Postsecondary Vocational
Education Programs Operated by School Districts
(Division of Occupational Education; 1985)

One Year Followup Report

Technical Committees
Program Advisory Committees

CBVE Task Lists
V-TECS Task Lists

Study of Changes in Voc-Tech Programs

Final Report: 1986 Strategies Conference

RESOURCES

Workforce 2000:	Work and Workers For the 21st Century (Hudson Institute)
Projections 2000:	Occupational Outlook (Bureau of Labor Statistics, Department of Labor)
Technology and Employment:	Innovation and Growth in the U.S. Economy (National Academy of Sciences)
Sex Segregation in the Workplace:	(National Academy of Sciences)

APPENDIX B

Chapter 74 Enrollments: 1987

1987 Chapter 74 Enrollments
Grades 9-12

Carpentry	3248
Auto Mechanic	3166
General Merchandise	3145
Electrical	2949
Machine Shop	2244
Culinary Arts	2175
Electronics	1966
Graphic Arts	1828
Body and Fender Repair	1770
Drafting	1570
Programming	1367
Cosmetology	1350
Plumbing & Pipefitting	1078
Health Aide	884
Nursing Assistant	882
Metalworking	829
Commercial Art	809
Cabinetmaking	787
Painting & Decorating	745
Sheet Metal	672
Air Conditioning	558
Welding & Cutting	524
Construction & Maintenance	487
Care & Guidance of Children	428
Inst. & Home Mgmt. & Services	389
Masonry	341
Ornamental Horticulture	280
Clothing Mgmt., Prod. & Serv.	278
Cook/Chef	264
Appliance Repair	223
Small Engine Repair	223
Printing Press Occupations	218
Food Services	197
Maritime Occupations	190
Diesel Mechanics	185
Animal Science	171
Food Mgmt., Produ. & Serv.	165
Upholstery	143
Textile Production	129
Radio & Television Repair	123
Business Technician	114
Scientific Data Technician	113
Medical Asst.	109
Hotel & Lodging	91
Agriculture Production	88
Stationery Energy Sources	87
Radio & TV Production	84
Agriculture Resources	78
Landscaping	77

1987 Chapter 74 Enrollments
Grades 9-12

Floriculture	72
Dental Lab Technician	66
Medical Lab Assistant	57
Forestry	56
Agriculture Mechanics	50
Metal Patternmaking	59
Small Business Management	46
Commercial Photography	45
Chemical Technician	45
Data Entry/Retrieval	44
Electronic Technician	43
Animal Science (small)	43
Industrial Sewing Machine Repair	40
Instrument Repair & Maintenance	38
Finance & Credit	34
Baking	30
Arboriculture	29
Plastics Occupations	24
Heavy Equipment Oper. & Maint.	22
Packaging Mechanic	19
Custodial Services	19
Dental Assistant	18
Packaging Technician	11
Poultry Science	8
Medical Lab Technician	7
Apparel & Accessories	6
Plant Science	2
17.0500 (not named)	2
Other Agriculture	380
Other Trade & Industrial	209
Exploratory	101
GRAND TOTAL	**41,436**

DIVISION OF OCCUPATIONAL EDUCATION
CHAPTER 74 ENROLLMENT BY RACE/SEX
SCHOOL YEAR 1986-87

USOE CODE	USOE TITLE	MALE	FEM.	TOTAL	AM IN MALE	AM IN FEM.	ASIAN MALE	ASIAN FEM.	BLACK MALE	BLACK FEM.	HISP MALE	HISP FEM.	WHITE MALE	WHITE FEM.
010101	ANIMAL SCIENCE	0	20	20	0	0	0	0	0	0	0	0	0	20
010299	ANIMAL TECH (GROOMING)	0	14	14	0	0	0	0	0	0	0	0	0	14
010401	FOOD PRODUCTS (LAB/DIET)	17	24	41	0	0	0	0	0	1	0	0	17	23
010502	FLORICULTURE	37	4	41	0	0	0	0	0	0	0	0	37	4
010505	NURSERY OPERATION & MGMT.	54	22	76	0	0	0	0	0	0	0	0	54	22
010601	NAT.RESOURCES/FORESTRY	28	6	34	0	0	0	0	0	0	0	0	28	6
040200	APPAREL & ACCESSORIES	1	33	34	0	0	0	0	0	1	0	0	1	32
040700	FOOD SERVICES	10	10	20	1	0	0	0	0	0	0	0	9	10
040800	GENERAL MERCHANDISE	0	1	1	0	0	0	0	0	0	0	0	0	1
070101	DENTAL ASSISTANT	1	58	59	0	0	0	0	0	0	0	0	1	58
070203	MEDICAL LAB ASST	1	9	10	0	0	0	0	0	2	0	0	1	7
070302	PRACTICAL NURSING	25	330	355	0	0	0	0	0	3	1	4	24	323
070305	SURGICAL TECHNOLOGY	3	25	28	0	0	0	0	0	0	0	1	3	24
070600	OPHTHALMIC	12	5	17	0	0	0	0	0	0	0	1	12	4
070904	MEDICAL ASSISTANT	0	98	98	0	1	0	0	0	2	0	3	0	92
160103	ARCHITECTURAL TECH	68	12	80	0	0	0	0	1	1	2	0	65	11
160107	ELECTRICAL TECH	33	2	35	0	0	0	0	0	1	0	0	33	1
160108	ELECTRONIC TECH	64	7	71	0	0	5	0	0	0	7	0	52	7
160109	ELECTROMECHANICAL TECH.	10	0	10	0	0	0	0	0	0	1	0	9	0
160401	PROGRAMMER	27	32	59	0	0	1	4	0	0	0	1	26	27
170100	AIR CONDITIONING	5	1	6	0	0	0	0	0	0	0	0	5	1
170200	APPLIANCE REPAIR	2	0	2	0	0	0	0	0	0	0	0	2	0
170301	BODY & FENDER REPAIR	5	0	5	0	0	0	0	1	0	0	0	4	0
170302	AUTO MECHANICS	24	1	25	0	0	1	0	1	0	0	0	22	1
170700	COMMERCIAL ART OCCUP.	16	25	41	0	0	0	0	1	0	3	0	12	25
171001	CARPENTRY	19	4	23	0	0	1	0	0	0	0	0	18	4
171002	ELECTRICITY	9	0	9	0	0	0	0	0	0	0	0	9	0
171003	HEAVY EQUIP. OPER.&MAINT.	1	0	1	0	0	1	0	0	0	0	0	0	0
171005	PAINTING & DECORATING	4	1	5	0	0	0	0	0	0	1	0	3	1
171007	PLUMBING & PIPEFITTING	11	0	11	0	0	0	0	0	0	0	0	11	0
171099	CONSTR. & MAINT., OTHER	1	0	1	0	0	0	0	0	0	0	0	1	0
171300	DRAFTING OCCUPATIONS	78	12	90	0	0	1	0	1	0	1	0	75	12
171400	ELECTRICAL OCCUPATIONS	8	0	8	0	0	0	0	0	0	0	0	8	0
171500	ELECTRONIC OCCUPATIONS	4	0	4	0	0	0	0	0	0	0	0	4	0
171900	GRAPHIC ARTS OCCUP.	9	1	10	0	0	0	0	0	0	0	0	9	1
172302	MACHINE SHOP	19	2	21	0	0	5	0	1	0	0	0	13	2
172305	SHEET METAL	5	0	5	0	0	0	0	0	0	0	0	5	0
172306	WELDING & CUTTING	22	0	22	0	0	2	0	0	0	0	0	20	0
172602	COSMETOLOGY	5	140	145	0	2	0	0	0	0	0	2	5	136
172900	QUANTITY FOOD OCCUP.	7	3	10	0	0	0	0	1	0	0	0	6	3
172901	BAKING	5	2	7	0	0	0	0	0	0	0	0	5	2
172902	COOK/CHEF	39	30	69	0	0	0	0	0	0	1	0	38	30
173600	WOODWORKING/CABINETMAKING	5	1	6	0	0	0	0	0	0	0	0	5	1
*** Total ***		694	935	1629	1	3	17	4	7	11	17	12	652	905

APPENDIX C

Products Availability Report

From

Vocational-Technical Education Consortium of States (V-TECS)

COMPLETED V-TECS CATALOGS

NO.	YEAR		NO.	YEAR	
IN04	83	Accounting Clerk	PA05	82	Dairy Worker
			VA02	82	Data Entry Operator
GA08	80	Appliance Repairer	WI05	81	Dental Hygienist
PA06	82	Audio Visual Repairer	GA11	80	Dental Laboratory Technician
PA10	84	Auto Air Conditioning and	FL19	85	Diesel Mechanic
		Electrical System Tech.	IL02	83	Duplicating Machine Operator
WV08	83	Auto Engine and Drive	GA07	80	Electronic Mechanic
		Train Technician	AL01	81	Environmental Control System
PA09	85	Auto Eng. Performance Tech			Installer/Servicer
WV13	85	Auto Mechanics: Sus-	FL10	80	Farm Equipment Mechanic
		pension Systems, Brakes &	IN06	84	Farm Machinery Set-Up
		Steering			Mechanic
PA04	81	Baker	KY14	81	Fashion Salesperson
			MD11	85	Floriculture Worker, Retail
IN07	83	Bindery Worker/Web Press			Flowershop Salesperson &
		Operator			Floral Designer (revision)
WV17	87	Bricklayer (revision)	KY15	82	Food Marketing Manager/Supv.
WV05	81	Building Repairer	IN05	81	Garden Center Salesperson
SC03	80	Business Machine Repairer	MI03	80	Hardware Salesperson
TN02	81	Cabinetmaker	PA01	80	Heavy Equipment Mechanic
PA07	83	Carpenter (revision)	9999	80	Homemaker: Clothing &
VA04	84	Caterers			Textiles
FL13	82	Commercial Cook	9999	80	Homemaker: Foods
		(revision of Food Pre-	9999	80	Homemaker: Housing &
		paration Worker)			Furnishings
IL09	85	Computer Equipment Repair	9999	80	Homemaker: Human Development
VA05	81	Computer Operator(rev.)	9999	81	Homemaker: Management &
IL08	85	Computerized Numerical			Family Economics
		Control	TN01	81	House Electrician
GA13	82	Concrete Worker	KY08	80	Industrial Electrician
FL14	83	Corrections Officer	WI01	81	Industrial Maintenance Mech.
FL16	83	Corrections Sergeant	MS06	78	Ind. Sewing Mach. Oper/Tech.
VA12	84	Cosmetologist (revision)	IL05	84	Industrial Traffic Manager
MD06	81	Land Survey Party	GA10	80	Radio Communications
PA11	84	Laser System Technician	GA09	80	Radiographer
GA01	82	Licensed Practical Nurse	IL17	87	Radiologic Technology
		(revision)			Occupations
IL06	83	Machine Tool Operation	MD12	84	Radio/Television Service
KY01	82	Machinist (revision)			(revision)
IN03	83	Mechanical Drafter	WV06	83	Real Estate Salesperson
IN08	83	Medical Clerical Worker	PA13	83	Records Manager
WI04	81	Medical Record Technician	GA12	84	Refrigeration Mechanic
PA03	81	Medical Secretary	FL21	85	Respiratory Therapist
MD05	81	Nuclear Medicine			(revision)
		Technologist	PA12	84	Robotics Technician
MS14	87	Office Manager (revision	GA14	82	Roofer
		of Executive Secretary	MI04	81	Secretary (revision)
VA01	80	Operating Room Technician	PA08	82	Sheet Metal Worker
FL17	84	Opticianry			(revision)

COMPLETED V-TECS CATALOGS
(continued)

SC05	81	Orchardist
IL14	87	Ornamental Horticulture
FL15	82	Parenting
TN05	82	Photo Laboratory Tech.
MD09	84	Plumber (revision)
VA03	83	Poultry Farmer
MA01	87	Printing Occupations (revision)
VA14	87	Programmer/Analyst (revision of Computer Programmer)
W103	82	Property Manager
IL04	83	Shipping & Receiving Worker
PA02	80	Solar Heating Mechanic
TN04	82	Still Photographer
VA15	87	Supervisor of Administrative Services
AR01	87	Tractor Trailer/Truck Driver (revision)
AL11	82	Upholsterer
PA15	86	VCR & Related Equipment Repair
WV07	81	Waiter/Waitress
LA02	78	Water/Wastewater Treatment Plant Operator
MD08	83	Welder (revision)

COMPLETED V-TECS CURRICULUM GUIDES

No.	Year	
SC34	87	Architectural/Mechanical Drafter
SC14	84	Auto Body Repairer
SC30	87	Auto Engine and Drive Train Technician
SC19	86	Bookkeeping/Accounting/Payroll Clerk
WV11	87	Building Repairer
IL11	86	Computer Equipment Repair
IL10	86	Computerized Numerical Control
SC17	85	Cosmetology
SC18	86	Data Processing
SC23	86	Electronics Mechanic
SC24	86	Environmental Control System Installer/Servicer
SC32	87	Executive Secretary
SC10	84	Farm Business Manager
SC09	82	Homemaker: Housing & Furnishings
SC13	84	Hospital Ward Clerk
SC29	86	House Electrician
MD10	85	Industrial Electricity
SC25	86	Industrial Maintenance Mechanic
SC16	85	Machine Shop
SC11	82	Masonry
WV10	86	Miner I
SC15	85	Plumbing
IL07	84	Secretary
WV14	87	Sheep Rancher
SC33	87	Small Engine Repairer
SC31	87	Tractor Mechanic
PA16	86	VCR & Related Equipment Repair
SC26	86	Word Processing

V-TECS CATALOGS UNDER DEVELOPMENT

Project Number & Title		Starting Date	Projected Completion Date	Date Final Catalog Received
AR05	Emergency Medical Technician (REV)	7/88	7/89	
FL22	Dental Hygienist (REV)	2/86	9/86	
KS01	Paralegal/Legal Assistant	9/85	6/88	
MD13	Roofer (REV)	1/88	12/88	
MD14	Legal Secretary (REV)	8/85	9/87	
MD15	Drywall Installer	9/87	9/88	
MA01	Printing Occupations (REV)	10/86	6/87	10/87
MA03	Surgical Technician (REV of Operating Room Technician)	11/87	6/88	
MS15	Bank Clerk (REV)	10/87	6/88	
MS18	Hotel/Motel Desk Clerk (REV)	10/87	4/88	
MS23	Gerontology Aide	11/87	8/88	
NY01	Introduction to Technology	7/86	7/87	
OR01	Electronic Servicing	9/87	9/88	
PA17	Child Care and Guidance (REV)	3/87	7/88	
VA16	Nursing Assistant (REV)	1/85	4/88	
WV18	Architectural Drafter (REV)	2/86		

V-TECS CURRICULUM GUIDES UNDER DEVELOPMENT

Project Number & Title		Starting Date	Projected Completion Date	Date Final Guide Received
FL20	Opticianry	10/84	10/85	
IL15	Ornamental Horticulture	7/87	6/88	
IL18	Radiologic Technology	7/87	6/88	
IN09	Nursing Assistant for Long-Term Health Care	10/86	9/87	
MA02	Printing Occupations	10/86	6/87	
NY02	Introduction to Technology	7/86	7/87	
PA18	Child Care and Guidance	3/87	7/88	
SC35	Child Care Attendant	5/86	1/88	
SC36	Food Service Worker (Comm. Cook)	5/86	11/87	
SC37	Information Processing Specialist	5/86	10/87	
SC38	Auto Air Conditioning & Electrical System Technician	6/86	11/87	
SC39	Auto Engine Performance Technician	7/86	1/88	
SC40	Auto Mechanic: Suspension Systems, Brakes and Steering	11/86	4/87	
SC41	Farm Equipment Operator	10/86	3/88	
SC42	Records Management	10/86	3/88	
SC43	Carpenter	1/87	7/88	
SC44	Farm Equipment Mechanic	3/87	8/88	
SC45	Roofer	5/87	11/88	

V-TECS CURRICULUM GUIDES UNDER DEVELOPMENT

Project Number & Title	Starting Date	Projected Completion Date	Date Final Guide Received
VA17 Supervisor of Administrative Services	3/85	4/88	

V-TECS TEST ITEM BANKS
UNDERGOING COMPUTERIZATION

Project Number & Title		Starting Date	Projected Completion Date	Date Item Bank Received
*AL12	Secretarial Occupations		12/86	12/86
GA15	Machinist/Machine Tool	9/83	8/84	8/84
GA16	Welding	9/83	8/84	8/84
GA17	Auto Mechanics	9/84	8/85	8/85
GA18	Sheet Metal	9/83	8/84	8/84
GA19	Carpentry	6/85	7/86	7/86
GA20	Masonry	6/85	7/86	7/86
GA21	Small Engine	9/84	8/85	8/85
*IL12	Computerized Numerical Control	7/85	7/86	7/86
IL13	Computer Equipment Repair	7/85	7/86	7/86
MS09	Nurse Assistant	1/85	7/86	7/86
MS10	Cashier/Checker			2/86
MS11	Homemaker: Management & Family Economics	6/86	4/87	4/87
*MS12	Office Manager	6/86	4/87	4/87
*MS13	Farm Business Manager		2/87	2/87
*WV12	Building Repairer		11/86	11/86
*WV15	Bricklayer	10/86	2/87	2/87

*Distributed to member states.

APPENDIX D

Competency Based Vocational Education

Products Completed

Competency Based Vocational Education

UPDATE

April, 1988

CBVE UPDATE

The Commonwealth of Massachusetts began its commitment to the development of Competency-Based Vocational Education Programs in June, 1981. Since that time twenty-two curricula have been developed and three more are currently being written. Of these, the curricula for thirteen different vocational programs have already been disseminated throughout Massachusetts with more to be disseminated in the spring of 1988.

Already in use are Hotel and Lodging, Foods Management and Production and Services, Machine Technology, Auto Mechanics, General Merchandising, Computer Technology, Health Assistant, Electrical Technology, Electronic Technology, Child Development Assistant, Drafting, Medical Assistant, and Ornamental Horticulture.

Due to be released in the near future: Metal Fabrication; Carpentry; Auto Body Repair; Plumbing and Pipefitting; Graphic Arts; Health Assistant II; Accounting and Computing; Heating, Ventilation, Air Conditioning and Refrigeration; Painting and Decorating; and Finance and Credit.

Commercial Art, Fashion Design and Electromechanical Technology are currently being developed.

CBVE - WHAT IS IT?

Competency-Based Vocational Education is not new at all. It goes by many other names - personalized instruction, individualized instruction, programmed learning, mastery learning and other names. What is new is CBVE as a formally organized set of principles developed into a program of learning and instruction. CBVE is based on two simple concepts:

1. Competency is the ability to independently and satisfactorily perform job related tasks in an occupational setting.

2. Most students can master most tasks at high levels of proficiency if given high quality instruction and sufficient learning time.

CBVE - HOW DOES IT BEGIN?

The Division of Occupational Education asks for proposals to write curriculum. From the group of proposals two schools are chosen in a particular program area. These schools each draw up a task list for the program in their respective schools. The two schools then meet, combine task lists into one and have that list validated by industry. The schools then divide the tasks and write learning guides for each task. These guides are sent to the leadership team for editing, are revised and then printed for dissemination.

CBVE - HOW CAN IT HELP ME?

CBVE Solves Vocational Problems

CBVE is becoming widely accepted as an effective method of instruction and learning. It also offers solutions to some of the common problems that face vocational educators:

Evaluation: In order to be a meaningful representation of the student's academic achievement, achievement should be based on criteria which accurately mirror the performance standards of the business or industry area. Too often in current vocational educational practice, those criteria have not been adequately specified in measurable terms. CBVE does specify those criteria, task by task.

Diploma: Closely related to the evaluation dilemma is that of the graduation diploma or certification. Few students find the present duration of the program ample to gain competency in all the skills and knowledge listed in the curriculum. Fewer still achieve the maximum level of excellence possible for each area. The diploma thus offers very little information for student placement purposes, to educators or prospective employers. Through the use of the competency checklist, CBVE avoids this dilemma.

Training and Placement of the Handicapped: Handicapped individuals, whatever their disability, may require certain task modifications to achieve full competency or employability. CBVE specifies, through task analysis, the job-related competencies required in the work place. It thereby increases the likelihood that handicapped individuals will receive quality training and employment commensurate with their abilities.

Transfer Students: Transfer students going from a vocational program in one school to the same program in another, frequently find that the course content varies radically from one to another. Uniform standards of quality, geared also to the requirements of business and industry, can be better insured with the competency-based curriculum approach.

Recommendations: To avoid the subjectivity that enters into the writing of recommendations, increasing numbers of personnel officers are requiring that such information be detailed in terms of numerical ratings on job related criteria. The competency-based curriculum which is based on a similar format, facilitates the writing of more well-defined and objective recommendations.

CBVE Improves Instruction

Some criticism of the conventional approach to education often includes:

A. At the Administration and Instruction Levels

1. Often instructors are not sure exactly what is to be learned and follow a text or curriculum, current or outdated with respect to employment needs.
2. There are not enough high quality student learning materials.
3. When the instructor leaves, the curriculum leaves.
4. The impact of reduced state aid and local funds impose restraints on curriculum revisions.

B. At the Student Level

1. Students are rarely informed about exactly what is to be learned.
2. Students are often forced to move on to the next task before fully mastering the one they are working on.
3. Students may sit through instruction in tasks they have already mastered.
4. Too few trainees reach a high level of proficiency in each task.
5. Many marginally competent students slide by with low grades and yet complete the program.

The distinguishing characteristics of CBVE which address these issues are:

1. CBVE programs are based on precisely stated, occupationally verified competencies or tasks required for competent performance in employment.
2. Students learn from carefully developed, high quality learning materials supported by instructor interaction at appropriate times.
3. Both instructor and student have in writing a list of the exact tasks to be mastered and the level of competence required as evidence of an acceptable level of mastery.
4. Students are allowed to continue working on each task until the required level of mastery is attained and only then move to the next task. Consequently, test anxiety is reduced, responsibility and self-reliance are promoted and fewer students fail.
5. Each student must actually demonstrate ability to perform each task at the stated level of proficiency to be considered competent. This promotes frequent feedback to students on performance, promotes articulation and makes more accountability possible.

6. CBVE as it is being implemented in Massachusetts brings together the resources of the state and several schools in a more cost-effective manner for the development of curricula that will be shared with all vocational institutions. In addition, copies of all the products will be available through the CBVE Coordinator's office located at Greater Lowell Regional Vocational Technical School, Pawtucket Blvd., Tyngsboro, MA 01879 at a cost of $80.00 per volume.

Math Science Model Projects

The Math Science Model Projects began in December of 1984 at the Greater Lowell Regional Vocational Technical School and was funded by federal grants through the Massachusetts Department of Education, Division of Occupational Education. This Model Project is designed to identify and define math and science competencies for each developed CBVE Program. The results of the Math Science Model Project are a series of manuals containing relevant Math and Science competencies which correlate to specific CBVE tasks and duties.

These Math Science Model Project manuals serve as guides for vocational, related and academic instructors to assist them in developing and adopting existing academic curricula in order to facilitate the implementation of programs.

The manuals in the first project, completed in 1985, identify math and science competencies in four vocational CBVE Programs: Computer Technology, Health Assistant, Foods Management and Production and Service, and Ornamental Horticulture/Turf Management.

The second project, completed in 1986, identifies math and science competencies for five vocational CBVE programs: General Merchandising, Auto Mechanics, Electrical Technology, Medical Assistant and Hotel and Lodging.

These manuals provide lists of specific competencies for each CBVE Task which help math and science instructors adapt their curricula to enhance and support the vocational instruction provided by CBVE curricula.

FOR EXAMPLE: A math instructor may use a Math Science Model Projects manual to identify math competencies which are relevant to the vocational tasks in a specific CBVE program. By stressing these math competencies in their academic or related classrooms, instructors can help to reinforce their students' ability to relate math concepts directly to skills they are developing through the CBVE curricula.

Although there are instances where math and science competencies are not, nor should be, listed in specific CBVE tasks, the Division of Occupational Education and the Math Science Competency Program encourage a full program of math and science for all students.

The Math Science Model Project has provided a valuable opportunity for academic, related and vocational instructors from a variety of vocational schools across Massachusetts to work together to expand the concept of CBVE. The ultimate success of this program will be demonstrated by the increased opportunities it will afford students to achieve future educational and occupational goals.

COMMUNICATIONS COMPETENCIES PROJECT

The Communications Competency Project began in the Fall of 1986 at Blue Hills Regional Vocational Technical School. At this time, five teams of academic and vocational teachers began identifying communications competencies for CBVE programs in the areas of General Merchandising, Electrical Technology, Electronic Technology, Hotel and Lodging, and Medical Assistance. Similar to the Math/ Science Competency Program, this project will identify communications competencies for existing CBVE programs.

To date, these teams have identified an extensive list of competencies necessary for effective communication. This list was then divided into seven sub-groups: grammar, vocabulary, speaking, listening, writing, reading and study skills.

These competency lists will soon be used to help language arts instructors adapt their curricula to complement the vocational instruction provided by CBVE by identifying specific communication skills relevant to a particular CBVE program. By stressing these communications competencies, academic instructors can help students relate communication skills to the skills they are developing in class.

COMPETENCY-BASED VOCATIONAL EDUCATION

PROJECT I (1982-83)

	PROGRAM	SCHOOL
1.	Hotel and Lodging	The Humphrey Center Minuteman Regional
2.	Foods Management and Production and Services	Greater Lowell Regional Tri-County Regional
3.	Electronics Technology	Greater Lowell Regional Minuteman Regional
4.	Machine Technology	Franklin County Regional Montachusetts Regional
5.	State Leadership Team	Assabet Valley Regional

PROJECT II (1983-84)

	PROGRAM	SCHOOL
1.	Auto Mechanics	Pathfinder Regional Cape Cod Regional
2.	General Merchandising	Greater. Lowell Regional The Humphrey Center
3.	Computer Technology	Blackstone Valley Regional Greater Lowell Regional
4.	Child Development Assistant	The Humphrey Center Fanning Trade, Worcester
5.	Health Assistant	Fanning Trade, Worcester
6.	Ornamental Horticulture	Minuteman Regional Norfolk Agricultural School
7.	State Leadership Team	Technical Educational Research Center

PROJECT III (1984-85)

	PROGRAM	SCHOOL
1.	Metal Fabrication	Blackstone Valley Regional Greater Lowell Regional
2.	Small Business Management	Nashoba Valley Technical Brockton High School
3.	Drafting	Montachusetts Regional Pathfinder Regional
4.	Auto Body Repair	South Shore Regional
5.	Carpentry	Shawsheen Technical Nashoba Valley Technical
6.	Medical Assistant	Fanning Trade, Worcester Shawsheen Technical
7.	Electrical	Pathfinder Regional Blue Hills Regional
8.	State Leadership Team	Greater Lowell Regional

PROJECT IV (1985-86)

	PROGRAM	SCHOOL
1.	Plumbing & Pipefitting	Shawsheen Technical Bay Path Regional
2.	Heating, Ventilation and Air Conditioning	South Shore Regional
3.	Graphic Arts	Blackstone Valley Blue Hills Regional South Shore Regional Bay Path Regional
4.	Health Assistant II	Fanning Trade, Worcester
5.	Metal Fabrication	Greater Lowell Regional
6.	Auto Body Repair	South Shore Regional
7.	State Leadership Team	Greater Lowell Regional

PROJECT V (1986-87)

	PROGRAM	SCHOOL
1.	Accounting & Computing	Blackstone Valley Nashoba Valley Technical
2.	Finance & Credit	The Humphrey Center
3.	Painting & Decorating	Blackstone Valley South Shore Regional
4.	State Leadership Team	Greater Lowell Regional

PROJECT VI (1987-88)

	PROGRAM	SCHOOL
1.	Commercial Art	Blue Hills Regional Greater Lowell Regional
2.	Electromechanical Service Technician	Minuteman Regional Pathfinder Regional
3.	Fashion Design	Cape Cod Regional Greater Lowell Regional
4.	State Leadership Team	Greater Lowell Regional

Alphabetical Listing of Schools Involved:

Assabet Valley Vo-Tech	Marlboro
Bay Path Regional	Charlton
Blackstone Valley Regional	Upton
Blue Hills Regional Vo-Tech	Canton
Brockton High School	Brockton
Cape Cod Regional Vo-Tech	Harwich
Fanning Trade	Worcester
Franklin County Tech	Turners Falls
Greater Lowell Regional Vo-Tech	Tyngsboro
Hubert H. Humphrey Center	Roxbury
Minuteman Regional	Lexington
Montachusetts Vo-Tech	Fitchburg
Nashoba Valley Vo-Tech	Westford
Norfolk Agricultural	Norfolk
Pathfinder Vo-Tech	Palmer
Shawsheen Tech	Billerica
South Shore Regional Vo-Tech	Hanover
Tri-County Regional Vo-Tech	Franklin

First Dissemination - March 21, 1985

Computer Technology
Foods Management and Production and Service
Hotel and Lodging Overview
Health Assistant
Ornamental Horticulture

Second Dissemination - January 27, 1986

I. Learning Guides

General Merchandising
Auto Mechanics Vol. I, II, III, IV, V
Hotel and Lodging
Electrical Technology
Medical Assistant
Machine Shop - Vol. I
Machine Shop - Vol. II

II. Math/Science Competencies

Computer Technology
Foods Management and Production and Service
Health Assistant
Ornamental Horticulture

Third Dissemination - January 1987

I. Learning Guides

Child Development Assistant
Drafting Vol. I
Drafting Vol. II
Electronics Vol. I
Electronics Vol. II

II. Math/Science Competencies

Hotel and Lodging
General Merchandising
Electrical Technology
Auto Mechanics
Medical Assistant

Fourth Dissemination - June 1988

I. Learning Guides

Carpentry Vol. I
Carpentry Vol. II
Finance and Credit
Health Assistant Vol. I
Health Assistant Vol. II
Metal Fabrication
Plumbing and Pipefitting

II. Math/Science Competencies

Carpentry
Child Development Assistant
Drafting
Electronics
Metal Fabrication
MSCP Matrix

Awards

Vocational Instructional Materials Award
Massachusetts Manual for Competency Based Vocational Education Curriculum

APPENDIX E

Excerpts From State Plan

For Vocational Education

For Fiscal Years 1989-1990

GOALS AND OBJECTIVES

The goals and objectives that are presented on the following pages have emerged from the assessment of need that was carried out over an eighteen month planning period (January 1986 - July 1987). The findings of this assessment and activities proposed to meet these goals and objectives are listed on the charts in Section 5 of this Plan. The list of findings and activities includes a coding that relates each item to the related goal and objective.

These goals and objectives are proposed for a four year period: Fiscal Years 1989-1992. The Massachusetts Department of Education is currently operating on the basis of a five year plan that also runs through 1992. It should be noted that the goals presented in this State Plan for Vocational Education are most significant and far reaching and will not be completely achieved during the life of this Plan (Fiscal Years 1989-1990).

The activities proposed in this Plan are intended to be accomplished during the next two fiscal years and are intended to contribute noticeably to the accomplishment of the stated goals and objectives. The results from the activities will be the measure of the success of this Plan and those results will be used to reassess the goals and objectives for continued pursuit during Fiscal Years 1991 and 1992.

A. TO ASSURE EQUAL ACCESS AND TO ASSURE EQUAL OPPORTUNITY FOR ALL STUDENTS TO SUCCEED IN VOCATIONAL EDUCATION.

1. Successful innovative strategies for vocational schools to recruit and retain students, especially from target populations will be reported.

2. The number of racial and linguistic minority students in vocational education programs will increase.

3. An increased number of pregnant and parenting teenagers will receive education, training, and other services through vocational education.

4. The needs and success rate of linguistic minority students for vocational education programs and services will be assessed.

5. Vocational education programs to address the needs of dropouts will increase, especially for economically disadvantaged populations.

6. Issues affecting vocational education programs will be included in school district comprehensive equity plans.

7. Support services for special needs students will continue to be provided to enhance these students' capacity to succeed in vocational education and to transition effectively to the workplace.

8. Vocational education programs will be available to youth in the care of the Division of Youth Services on a more permanent basis.

9. Incarcerated populations will continue to be served with vocational education programs that connect to adult basic education. Funds beyond the level required by the Perkins set-aside will be provided.

10. Vocational education programs that address the unique training needs of adult refugee populations will be supported.

11. Model vocational education programs that link parent training with their children's education will be encouraged.

12. Students who choose to study a non-traditional occupation will be supported to succeed in vocational education including placement activities.

13. The number of technical and technology dominated occupations will be expanded for the purpose of attracting female students into high wage occupations.

14. Employed adults will be recruited to serve as mentors and to provide career counselling to youth at risk to drop out or to be underemployed or unemployed.

B. TO IMPROVE THE BASIC AND OTHER ACADEMIC SKILLS OF STUDENTS PARTICIPATING IN VOCATIONAL EDUCATION.

1. Students scores will increase in those schools where 9th grade students in occupational and vocational programs scored low on basic skills tests administered through the Statewide Basic Skills Testing Program.

2. Teachers in vocational schools and programs will have a greater understanding of methods of improving the basic skills of their students.

3. Vocational educators will have a more complete understanding of the interrelationship of academic and occupational competencies.

4. The capacity of vocational educators to assess the interests and abilities of potential students will be strengthened.

5. An increased number of secondary school students will learn through an applied methodology.

6. Methods of assessing the mathematics, science, and communication competencies that students acquire in vocational education programs will be demonstrated.

C. TO IMPROVE AND UPDATE THE CURRICULUM, PERSONNEL, AND FACILITIES AVAILABLE TO VOCATIONAL EDUCATION STUDENTS.

1. Promising practices in vocational education will be documented and promoted.

2. Leadership potential and capacity of vocational administrators and teacher leaders will be enhanced.

3. The pool of individuals eligible to teach in vocational education will increase, especially in areas of acute shortage.

   Special emphasis will be given to recruitment of minority and nontraditional female vocational education teachers.

4. Vocational teachers will improve their ability concerning occupational and pedogogical skills as follows:

   - o educational technology
   - o student learning styles
   - o applications of science, mathematics, and communications competencies
   - o expanded knowledge of specialty occupational areas
   - o entrepreneurship opportunities
   - o teaching diverse populations

5. Performance based vocational teacher education programs will be monitored.

6. The capacity of vocational teachers to develop, manage, and evaluate curriculum will be increased.

7. A statewide vocational curriculum resource center to provide materials and training to teachers and other school staff will continue to be supported.

8. The adoption of competency based vocational education methods and curricula will be promoted.

9. Instructional and evaluation materials to improve safety and health in vocational education will be field tested and disseminated.

10. Vocational schools will improve their ability to plan, acquire, and utilize technology in the curriculum.

11. The activities of vocational student organizations, as an integral part of vocational education programs, will be available to an increased number of students, especially target populations.

12. Vocational school involvement in new state supported initiatives for school improvement will be encouraged.

D. TO EDUCATE AND TRAIN STUDENTS IN OCCUPATIONAL FIELDS THAT PROVIDE OPPORTUNITIES FOR GROWTH AND ADVANCEMENT

1. High quality occupational information will be available to vocational educators and students.

2. Vocational educators will remain current on the nature of occupations.

3. Incentives will be created to encourage the discontinuance of vocational education programs that do not adequately address labor market needs.

4. Equipment in vocational education programs heavily impacted by technological developments will be upgraded.

5. The establishment of an increased number of technical occupational fields of study will be promoted.

6. An increased number of females will be enrolled in technical and technology dominated occupations.

7. An increased number of single parents and displaced homemakers will receive skills training and support services.

8. Technology education programs for 7th and 8th grade students will be developed and field tested.

9. School-to-work transition programs for general program students, primarily in urban areas, will be supported.

10. New programs and/or modification of existing programs will be encouraged to incorporate the skills and knowledge of new technology.

11. Dislocated workers will be served in vocational education and training programs.

12. Programs, services and activities designed to eliminate sex bias and stereotyping and to enable girls and women to support themselves and their families will be provided

E. TO COORDINATE VOCATIONAL EDUCATION PROGRAMS AND SERVICES WITH OTHER PUBLIC AGENCIES AND THE PRIVATE SECTOR SO THAT RESIDENTS OF MASSACHUSETTS HAVE ACCESS TO THE FULL ARRAY OF SERVICES AVAILABLE

1. Information on vocational education programs will be distributed to a wide audience.

2. The Interagency Coordination Committee will assist the Division of Occupational Education to identify and implement coordination strategies.

3. Programs and activities supported by the Carl D. Perkins Vocational Act will be coordinated with programs and activities supported by the School Improvement Act of 1985 (Chapter 188).

4. Vocational education will coordinate with adult basic education to more effectively connect their programs and services.

5. Vocational education will coordinate with other state agencies in the employment and training system.

6. Vocational schools, comprehensive schools, and community colleges will more effectively coordinate their programs.

7. Vocational schools, community colleges and the private sector will form additional partnerships.

8. Vocational education will coordinate with providers of apprentice training programs to share data, to improve curricula, to improve teaching staff, and to assist in recruitment of underrepresented populations.

9. Vocational education advisory committees will be more effectively utilized.

10. The operation and initiatives of technical committees, composed of employers and labor representatives, will be supported.

11. The strengths and weaknesses of the relationship between special education and vocational education will be assessed.

12. The special support services needed by program participants, including child care services, will be provided on a coordinated basis with other state agencies.

13. A greater number of welfare clients will be provided skills training that complements support services received in programs operated by other state agencies.

Assessment Findings -
The assessment of need conducted by the Division of Occupational Education over a period of eighteen months (January, 1986-June 1987) included many points of view and a considerable amount of information. As indicated, several hundred individuals were directly involved in the assessment process and many needs surfaced. It is the purpose of this State Plan for Vocational Education to match proposed activities to the needs of populations to be served and to the needs of vocational education to provide the requisite services. It is important to note that vocational education in Massachusetts is a local-state partnership with a locally based system for program and service delivery. The enactment of the proposed activities and the achievement of goals and objectives require a cooperative approach and effective coordination on the state and local levels.

The section that follows this introduction may be described as the centerpiece of the State Plan as it presents the findings of the assessment and matches activities that are proposed to meet the needs. There are many findings and many needs, but there are several needs that more clearly emerged from the assessment and that deserve this highlight. They are presented here in topic form and in no established order of priority.

Significant Issues

Coordination between secondary and postsecondary vocational education;

Coordination between job training programs and vocational education;

Coordination between adult education and vocational education;

Integration (or reinforcement) of academic competencies in vocational education programs;

Use of vocational-technical education methodology for general program students (e.g. applied learning programs);

Participation of minorities in vocational education;

Method of distribution of federal vocational education funds (competitive versus allocation);

Coordination of Public Law 98-524 with Chapter 188;

Remediation of basic skills deficiencies of students entering vocational-education;

Imbalanced selection of occupation of study by sex (i.e. females selecting lower wage occupations);

Private sector participation in vocational education;

Partnerships with other state agencies;

Relationship of vocational education and special education;

Increased awareness of vocational education by the public;

These are issues that were raised by more than one group and that cut across the full range of challenges and needs for further improvement of vocational education. There is also a strong connection amongst these issues and success in achieving objectives for one challenge will reinforce accomplishments for others.

The information presented on the charts that follow is organized in a format that is intended to relate the assessment findings to specific proposed activities. The following notes are provided to explain the meaning of headings and references used on the charts:

Finding
(Assessment Source

A summary statement of the findings of the Division's assessment. The code that follows the statement refers to the Outline of the Assessment Process (Appendix B) and thereby indicates the source of the finding.

Goal Obj.

The code used in these columns refers to the listing of Goals and Objectives located in Section C of this Plan. The Goals and Objectives are established for a four year period (1989-1992) and the related set of activities will be carried out over the two years of this State Plan (Fiscal Years 1989-1990).

Activity

These activities are proposed to address the goals and objectives developed from the assessment and would be carried out during the two years of this State Plan (Fiscal Years 1989-90).

Target Populations

These are the groups that have the primary need to be met by the activity. There may be additional groups that will benefit from either the activity or the outcomes.

Source of Funds

Here you will find a variety of state and federal funding sources listed. There is no obligation of funds beyond Public Law 98-524, but this listing is intended to direct the reader's attention to sources of funds that match the proposed activity. In some cases, the achievement of the activity would require additional state funds.

Service Providers

These are the primary and support organizations or groups that would deliver the services. This column shows the reader who would actually provide the service or activity, not just the institutions to be funded. For example, teacher training programs might be funded through a school district or an institution of higher education, but teachers with a particular expertise would lead the training in many cases.

Related Agencies

This column lists the units of the Department of Education and other state agencies that have a program or interest that relates to proposed activity. Coordination with these agencies will be emphasized for the stated activities.

It is understood that the Division of Occupational Education and the Department of Education's Regional Education Centers will be involved in some way in all of the activities outlined in this Plan.

The Division of Occupational Education requires all applications for funding to include equity objectives. An emphasis on enrollment of females in technical and technology dominated occupations will be a special feature of the Division's application review process during Fiscal Years 1989-1992.

(SCOVE) indicates that the State Council on Vocational Education made a recommendation that relates to this activity.

Finding (Assessment Source)	Goal	Obj.	Activity	Target Populations	Source of Funds	Service Providers	Related Agencies
The percentage of minority students enrolled in Chapter 74 Programs is less than the percentage of minority students in secondary education. Blacks 6.1% vs. 6.6% Linguistic 4.8% vs. 5.5% (II. B.2) and	A	1 2 4	Coordinate the implementation of recommendations from the Fiscal Year 1988 Project: Future Young Minority Citizens	Racial and Linguistic Minorities	PL98-524 Ch 188	School Systems	Community Based Organizations
The participation of minority populations in the labor market is lower by all measures, than the total population. (II.B.3)	A	1 2	Continue to support the expansion and improvement of vocational-technical education facilities and programs in urban school districts	Racial and Linguistic Minorities	School Building Assistance Ch188	Department Staff School Systems	Division of School Services
and The dropout rate is highest in urban school systems that include the highest percentage of minority populations. and The future workplace opportunites for people with less than a high school diploma is negligible. (I.B.8-10, 12, 13)	A	1 6	Support the inclusion of vocational-technical education programs in the comprehensive equity plans developed for urban school districts	Racial and Linguistic Minorities	Ch 636	Department Staff School Systems	Bureau of Equal Educational Opportunity

Finding (Assessment Source)	Goal	Obj.	Activity	Target Populations	Source of Funds	Service Providers	Related Agencies
	A	1 2 5	Promote increased access to quality vocational-technical education for minority students by:	Racial and Linguistic Minorities			
			a. strong internal and external evaluative measures to assure program quality;		PL98-524 Ch188	School Systems Department of Education	Chapter 74 Advisory Committees
			b. increased community involvement in program development and occupational information sharing;				Community Based Organizations Chapter 74 Advisory Committees
			c. career exploratory programs for 7th-9th grade students that include opportunities for experiential learning;		PL 98-524 Title IIA	School Systems	
			d. preservice and inservice training for counsellors to focus upon career opportunities and the need for a better match between student learning styles and educational program options.		PL 98-524 Title IIB Title III	School Systems Institutions of Higher Education	Occupational Information Coordinating Committee Board of Regents of Higher Education

GOAL A: TO ASSURE EQUAL ACCESS AND TO ASSURE EQUAL OPPORTUNITY FOR ALL STUDENTS TO SUCCEED IN VOCATIONAL EDUCATION.

Finding (Assessment Source)	Goal	Obj.	Activity	Target Populations	Source of Funds	Service Providers	Related Agencies
	A E	5 6	Innovative programs coordinated between secondary schools and community colleges to attract dropouts back to an educational experience that leads to a high school diploma and that includes options for further education and work experience. **SCOVE**	Drop Outs	Ch 188 PL98-524 Title IIA	Secondary Schools Community Colleges Community Based Organization	Board of Regents Employers Division of School Programs

GOAL A: TO ASSURE EQUAL ACCESS AND TO ASSURE EQUAL OPPORTUNITY FOR ALL STUDENTS TO SUCCEED IN VOCATIONAL EDUCATION.

GOAL E: TO COORDINATE VOCATIONAL EDUCATION PROGRAMS AND SERVICES WITH OTHER PUBLIC AGENCIES AND THE PRIVATE SECTOR SO THAT RESIDENTS OF MASSACHUSETTS HAVE ACCESS TO THE FULL ARRAY OF SERVICES AVAILABLE

Finding (Assessment Source)	Goal	Obj.	Activity	Target Populations	Source of Funds	Service Providers	Related Agencies
Vocational education programs are part of the solution to the unique needs of refugees. (II.A.8)	A	10	Support the development and operation of model vocational education programs that address the unique needs of refugees in cooperation with appropriate school system personnel and other local and state agencies.	Refugees	PL98-524 Title II	Vocational Schools Community Colleges	Department of Communities and Development Department of Social Services Other State and local agencies Bureau of Transitional Bilingual Education

GOAL A: TO ASSURE EQUAL ACCESS AND TO ASSURE EQUAL OPPORTUNITY FOR ALL STUDENTS TO SUCCEED IN VOCATIONAL EDUCATION.

Finding (Assessment Source)	Goal	Obj.	Activity	Target Populations	Source of Funds	Service Providers	Related Agencies
Many students entering vocational-technical education (9th grade) have basic skills deficiencies. (Basic Skills Testing) (III. B.9)	B	1	Basic skills remediation programs at each vocational-technical school/program.	9th Grade students in Chapter 74 programs	Ch. 188 PL98-524 Title IIA	Secondary Schools Community Based Organizations	Division of School Programs
	B	2	Comprehensive study of potential for reinforcement of basic skills in specific occupational subject areas.	Teachers and Administrators	PL 98-524 Title IIB Research	Qualified Researcher(s) Teams of Teachers	Office of Planning, Research and Evaluation
	B	2	Teacher training programs to empower academic, related, and vocational subject teachers to help students acquire basic skills.	Teachers	PL 98-524 Title IIB Prof. Dev. Teachers		Board of Regents of Higher Education Institutions of Higher Education Division of School Programs

GOAL B: TO IMPROVE THE BASIC AND OTHER ACADEMIC SKILLS OF STUDENTS PARTICIPATING IN VOCATIONAL EDUCATION.

Finding (Assessment Source)	Goal	Obj.	Activity	Target Populations	Source of Funds	Service Providers	Related Agencies
Success in the workplace requires a combination of competencies that include: o occupation specific o communication skills c computational skills o science and technology o reasoning and problem solving o social and economic studies o interpersonal relationships o personal work habits and attitudes	B	3	Development of a matrix chart to illustrate where communications, mathematics, and science competencies are embedded in specific occupational subject areas; Relate these competencies to the curriculum objectives identified by the Massachusetts Educational Assessment Program. (SCOVE)	Teachers and Administrators 9th-12th Grade Students	PL 98-524 Title IIB Research	Qualified Researcher(s) Teams of Teachers	Office of Planning, Research and Evaluation Division of School Programs Chapter 74 Advisory Committees Technical Committees
	B	3	Continue to support the development of manuals that detail the union of occupational competencies with communications, mathematics, and science knowledge and skills. (SCOVE)	Teachers and Administrators	PL 98-524 Title IIB Curr. Dev.	Secondary Schools; Teams of Teachers	Institutions of Higher Education
(I.A. 1-6; I.B. 1-3, 10-13)	B	3	Training programs to empower academic, related, and vocational teachers to help students to acquire these competencies.	Teachers	PL 98-524 Title IIB Prof. Dev.	Teachers	Board of Regents of Higher Education Institutions of Higher Education

GOAL B: TO IMPROVE THE BASIC AND OTHER ACADEMIC SKILLS OF STUDENTS PARTICIPATING IN VOCATIONAL EDUCATION.

Finding (Assessment Source)	Goal	Obj.	Activity	Target Populations	Source of Funds	Service Providers	Related Agencies
	B	5	Continue to promote and support the adoption of the Principles of Technology program (applied physics, mathematics, technology). Focus on the participation of females.	10th-12th Grade students Voc-Tech and Regular High Schools	Ch. 188 PL 98-524 Title IIB	Secondary Schools	Division of School Programs
	B	5	Continue to support the development and adoption of Applied Communications and Applied Mathematics curricula.	10th-12th Grade students Voc-Tech and Regular High Schools	Ch. 188 PL 98-524 Title IIB	Secondary Schools	Division of School Programs

GOAL B: TO IMPROVE THE BASIC AND OTHER ACADEMIC SKILLS OF STUDENTS PARTICIPATING IN VOCATIONAL EDUCATION.

Finding (Assessment Source)	Goal	Obj.	Activity	Target Populations	Source of Funds	Service Providers	Related Agencies
Many teachers need technical assistance on the development, management and evaluation of curriculum. and	C	4 6 7	Support the design of a concise guide to the development, management, and evaluation of competency based curriculum for vocational-technical education.	Academic Related and Voc-Tech Teachers	PL98-524 Title IIB	Mass. Voc. Curriculum Res. Ctr. CBVE State Leadership Project Teachers	In State Curriculum Network For Voc-Tech Education
Curriculum review procedures for use by local school districts need to be developed. (III.B.1)	C	4 6 7	Provide regional and school based technical assistance to teachers through the Massachusetts Vocational Curriculum Resource Center with the assistance of teachers and others expert in competency based vocational education.	Teams of Teachers	PL98-524 Title IIB	Teachers Mass Voc Curriculum Res. Ctr. CBVE State Leadership	
	C	7 8	Support the design, field test and dissemination of curriculum review procedures through the Massachusetts Vocational Curriculum Resource Center.	Teachers and Administrators	PL98-524 Title IIB	Mass Voc Curriculum Res. Ctr.	
Pregnant and parenting teenagers and refugees have been well served by specialized programs operated by service providers under Title III, Part B - Consumer and Homemaker Education funding. and	A	3	Support the refinement and expansion of programs designed to meet the special education and training needs of pregnant and parenting teenagers and refugees.	Pregnant and Parenting Teenagers Refugees	PL98-524 Title IIIB	Secondary Schools	Department of Welfare Department of Social Services

GOAL A: TO ASSURE EQUAL ACCESS AND TO ASSURE EQUAL OPPORTUNITY FOR ALL STUDENTS TO SUCCEED IN VOCATIONAL EDUCATION.

GOAL C: TO IMPROVE AND UPDATE THE CURRICULUM, PERSONNEL, AND FACILITIES AVAILABLE TO VOCATIONAL EDUCATION STUDENTS

Finding (Assessment Source)	Goal	Obj.	Activity	Target Populations	Source of Funds	Service Providers	Related Agencies
These two populations continue to be in serious and immediate need of these specialized programs. (II.B.2)							
Individuals incarcerated in correctional institutions need quality vocational-technical education in coordination with adult literacy programs. (II.A.6)	A E	9 4	Support the refinement and expansion of skills training programs that show labor market demand and are linked to adult basic education programs.	Incarcerated Individuals	PL98-524 Title IIA	State and County Houses of Correction	Department of Corrections Bureau of Adult Education Community Colleges
Innovative projects that have provided youth in the custody of the Department of Youth Services with opportunities to explore occupations through skills training programs have proven successful. (II.A.5,II.B.10)	A	8	Support the refinement and expansion of programs occupational exploration for this 'high risk' population.	Youth in custody of DYS	PL98-524 Title IIA	Voc-Tech Schools	Department of Youth Services Community Based Providers

GOAL A: TO ASSURE EQUAL ACCESS AND TO ASSURE EQUAL OPPORTUNITY FOR ALL STUDENTS TO SUCCEED IN VOCATIONAL EDUCATION.

GOAL E: TO COORDINATE VOCATIONAL EDUCATION PROGRAMS AND SERVICES WITH OTHER PUBLIC AGENCIES AND THE PRIVATE SECTOR SO THAT RESIDENTS OF MASSACHUSETTS HAVE ACCESS TO THE FULL ARRAY OF SERVICES AVAILABLE

Finding (Assessment Source)	Goal	Obj.	Activity	Target Populations	Source of Funds	Service Providers	Related Agencies
The population of single parents and displaced homemakers is increasing. and This population has an immediate need for a range of services and programs that includes counselling and skills training. and The coordination of Displaced Homemaker Support Centers with skills training programs supported by Perkins Act funds has been evaluated and found to be exemplary. (IIA.7,II.B.1)	D	7	Continue to fund skills training programs for single parents and displaced homemakers with a requirement that the service provider directly coordinate services with one of the state funded Displaced Homemaker Support Centers.	Single Parents Displaced Homemakers	PL98-524 Title IIA	Community Colleges School Districts	Bay State Skills Corp. Department of Welfare Department of Social Services Board of Regents of Higher Education
The percent of students in vocational-technical education (Chapter 74) who have special needs identified by individual education plans is higher than the percent of such students in secondary education. (18.4% vs. 12.6%)	A	7	Continue to fund support services for special needs students to provide the help needed by these students to succeed in vocational-technical education, including non-Chapter 74 programs.	Special Needs Students	PL98-524 Title IIA	Secondary Schools	Division of Special Education Massachusetts Rehabilitation Commission

GOAL A: TO ASSURE EQUAL ACCESS AND TO ASSURE EQUAL OPPORTUNITY FOR ALL STUDENTS TO SUCCEED IN VOCATIONAL EDUCATION.

GOAL D: TO EDUCATE AND TRAIN STUDENTS IN OCCUPATIONAL FIELDS THAT PROVIDE OPPORTUNITIES FOR GROWTH AND ADVANCEMENT.

Finding (Assessment Source)	Goal	Obj.	Activity	Target Populations	Source of Funds	Service Providers	Related Agencies
and The vast majority of the special needs students enrolled in vocational-technical education are served in mainstreamed programs. (II.B.2)							Massachusetts Association of Private Schools
Special needs students need assistance to transition from vocational-technical education programs to the workplace or to further education. (II.A.4,II.B.12)	A	7	Provide quality placement services for special needs students and connection to other transition services.	Special Needs Students		School Systems	Massachusetts Rehabilitation Commission Division of Special Education Higher Education Institutions
The applied learning methodology that forms the 'heart' of vocational-technical education has proven to be a successful educational process for thousands of students to acquire basic, developmental, and occupational competencies. (III.B.4)	B	5	Promote the adoption of applied methodology for general program students in comprehensive high schools, including Principles of Technology, Applied Communications, and Applied Mathematics. and the Math, Science, Communications (SCOVE)	General Program Students in Grades 9-12	Ch 188 PL98-524	School Systems	Division of School Programs

GOAL A: TO ASSURE EQUAL ACCESS AND TO ASSURE EQUAL OPPORTUNITY FOR ALL STUDENTS TO SUCCEED IN VOCATIONAL EDUCATION.

GOAL B: TO IMPROVE THE BASIC AND OTHER ACADEMIC SKILLS OF STUDENTS PARTICIPATING IN VOCATIONAL EDUCATION.

Finding (Assessment Source)	Goal	Obj.	Activity	Target Populations	Source of Funds	Service Providers	Related Agencies
and Research indicates that at least 50% of students (regardless of age) learn better through an applied methodology. and 25% of the Grade 11 students who participated in the Massachusetts Educational Assessment Program identified themselves as general program enrollees. (III.B.4)	B	5	Support the development of curricula for technology education programs that connect to mathematics and science concepts and skills. **SCOVE**	Secondary School Students	Ch 188 PL98-524	School Systems	Division of School Programs

GOAL B: TO IMPROVE THE BASIC AND OTHER ACADEMIC SKILLS OF STUDENTS PARTICIPATING IN VOCATIONAL EDUCATION.

Finding (Assessment Source)	Goal	Obj.	Activity	Target Populations	Source of Funds	Service Providers	Related Agencies
There is a strong need for an increased focus on safety and health practices and instruction in vocational education and a parallel need in industry. Recent environmental laws and regulations have increased the complexity of this issue. (III.A. 2-4) (III.B. 5-7)	C	9	Join forces with several state agencies and the private sector to design, disseminate, and evaluate a school and community based safety and health plan for vocational education.	Students Teachers Administrators	PL98-524 Title IIB Other State Federal and Private Sources	Qualified Researchers State Agencies Teachers	Department of Labor (state) Department of Environmental Management Department of Environmental Quality Engineering Department of Public Health Occupational Safety and Health Administration Industry and Labor Organizations

GOAL C: TO IMPROVE AND UPDATE THE CURRICULUM, PERSONNEL, AND FACILITIES AVAILABLE TO VOCATIONAL EDUCATION STUDENTS

Finding (Assessment Source)	Goal	Obj.	Activity	Target Populations	Source of Funds	Service Providers	Related Agencies
Students need to develop and practice study skills in order to facilitate the learning experience in school and beyond. (III. A. 8,11) (III. B.3,4,8) and	C	7	Continue the seminars for teachers on study skills development offered by the statewide curriculum research center. Cable delivered instruction will be developed and produced	Teachers Students Parents	PL98-524 Title IIB Ch 188 PL98-524 Ch188	Mass. Voc. Curr. Res. Center School Systems Teachers	Participating Schools Parent Advisory Committees Cable Networks
Parents have an important role in the reinforcement of study skills. (III.A. 8,11)	A	11	Support the development and field test of a guide to study skills for vocational program students with a companion document for parents. Offer student-parent training as part of field test.	Students Parents Teachers	PL98-524 Title IIB Ch188	School Systems	School Improvement Councils

GOAL A: TO ASSURE EQUAL ACCESS AND TO ASSURE EQUAL OPPORTUNITY FOR ALL STUDENTS TO SUCCEED IN VOCATIONAL EDUCATION.

GOAL C: TO IMPROVE AND UPDATE THE CURRICULUM, PERSONNEL, AND FACILITIES AVAILABLE TO VOCATIONAL EDUCATION STUDENTS

Finding (Assessment Source)	Goal	Obj.	Activity	Target Populations	Source of Funds	Service Providers	Related Agencies
Vocational program teachers need to further improve their skills in several areas: o educational technology o student learning styles o applications of science, mathematics, and communication competencies o expanded knowledge of of specialty occupational areas. o entrepreneurship opportunities o teaching diverse populations	C	4	Professional improvement programs and activities for academic, related, and shop/laboratory teachers.	Teachers	PL98-524 Title IIB Comm. Inservice Institute	Teachers Business Industry Labor	Division of Education Personnel
	E	7	Partnerships with industry that stress personnel exchanges and externships.	Teachers		Institutions of Higher Education	
	E	9	Improved utilization of vocational program advisory committees.	Teachers			

(IV. A. 6,9)
(III.B. 1,5,8)

GOAL C: TO IMPROVE AND UPDATE THE CURRICULUM, PERSONNEL, AND FACILITIES AVAILABLE TO VOCATIONAL EDUCATION STUDENTS

GOAL E: TO COORDINATE VOCATIONAL EDUCATION PROGRAMS AND SERVICES WITH OTHER PUBLIC AGENCIES AND THE PRIVATE SECTOR SO THAT RESIDENTS OF MASSACHUSETTS HAVE ACCESS TO THE FULL ARRAY OF SERVICES AVAILABLE

Finding (Assessment Source)	Goal	Obj.	Activity	Target Populations	Source of Funds	Service Providers	Related Agencies
There is a need to recruit qualified individuals, especially minorities, and females into teaching positions in vocational education. Technical occupations are experiencing severe shortages of teachers. (III. A. 8-9) III. B. 1,5,8)	C	3	Establish a statewide recruitment project that will highlight effective recruitment techniques and that will implement the recommendations of the Strategies Conference (October, 1986).	Potential Teachers	PL98-524 Title II.B	Institutions of Higher Education School Districts	Board of Regents

GOAL C: TO IMPROVE AND UPDATE THE CURRICULUM, PERSONNEL, AND FACILITIES AVAILABLE TO VOCATIONAL EDUCATION STUDENTS.

Finding (Assessment Source	Goal	Obj.	Activity	Target Populations	Source of Funds	Service Providers	Related Agencies
The vast majority of occupations that are the focus of program offerings in vocational-technical education are high demand occupations that offer opportunities for career growth and advancement. Most of these occupations have good to excellent wage and benefit possibilities and are heavily impacted by developments of technology. (IB9;IV.B.7)	D	2	Support the updating of high demand occupational programs through more effective utilization of vocational technical advisory committees, including training of school staff and advisory committee members.	All students enrolled in programs All teachers and administrators Advisory committee members	PL98-524 Leadership	Secondary Schools Division Staff will lead training.	Vocational-Technical Advisory Committees Technical Committees Office of Community Education
	D	4	Equipment upgrade program to keep high demand occupational preparation up-to-date and to incorporate new programs of instruction.	All students enrolled in programs	Requires new state funds.		Vocational Technical Advisory Committees Technical Committees

GOAL D: TO EDUCATE AND TRAIN STUDENTS IN OCCUPATIONAL FIELDS THAT PROVIDE OPPORTUNITIES FOR GROWTH AND ADVANCEMENT.

Finding (Assessment Source)	Goal	Obj.	Activity	Target Populations	Source of Funds	Service Providers	Related Agencies
The few occupations that offer poor to fair wage and benefit potential are less impacted by technology, more likely to be in the personal services fields, show lower placement rates, and are dominated by females in the workplace and in school enrollments. (III.B.2; IV.B.7)	D	2	Professional improvement programs for vocational-technical educators to remain current on occupational information, work practices, and job trends.	Teachers Counsellors Administrators	PL98-524	See Related Agencies Institutions of Higher Education	Division of Employment Security Occupational Information Coordinating Committee Chapter 74 Advisory Committees Technical Committees Advisory Committees Trade & Prof Associations
The wages of female completers are significantly lower than male completers of Chapter 74 programs due to their choice of occupational study. This wage disparity disappears in the few technical occupations that show enrollment of closer to equal numbers of females and males. (III.B.3)	D	5	Promote the establishment of more technical occupation fields of study. (SCOVE)	Secondary School Students	Requires New State Funds PL98-524	Schools with Ch 74 Programs With	
	D	6	Promote the enrollment of females in technical and technology dominated occupations:				
	D	6	a. Exploratory programs for 7th and 8th grade students in vocational-technical schools/programs; Include parents in stages of program;	Females in 7th and 8th Grade and their parents	PL 98-524 Title IIA Sex Equity	Voc-Tech Schools	
	D	8	b. Design and field test a technology education program with mathematics and science connections for 7th and 8th grade students; (SCOVE)	Students in 7th and 8th Grades; especially females	PL98-524 Ch 188	Comprehensive Schools	

GOAL D: TO EDUCATE AND TRAIN STUDENTS IN OCCUPATIONAL FIELDS THAT PROVIDE OPPORTUNITIES FOR GROWTH AND ADVANCEMENT

Finding (Assessment Source)	Goal	Obj.	Activity	Target Populations	Source of Funds	Service Providers	Related Agencies
	D	1 5 6	c. Cooperate with business industry, and labor organizations to identify or create high quality occupational information briefs in print, videotape, and/or computerized format that will effectively communicate to youth and parents the nature, education and training requirements, and rewards of occupations. **(SCOVE)**	students, especially in 7th-9th Grades especially females	PL 98-524 Title III and other sources	Schools and Private and Public Sector Organizations Occupational Information Coordinating Committee	Technical Committees Trade and Professional Organizations Labor Organizations Office of Community Education
	D E	7 4 5	d. Pilot test an occupational exploratory program for single parents that includes provision for childcare and seminars on child development and early childhood education. Require link to adult literacy program. **(SCOVE)**	Single Parents	PL98-524 Ch 188	Voc-Tech Schools Community Colleges	Office of Early Childhood Education Deparment of Welfare Department of Social Services Bureau of Adult Education

GOAL D: TO EDUCATE AND TRAIN STUDENTS IN OCCUPATIONAL FIELDS THAT PROVIDE OPPORTUNITIES FOR GROWTH AND ADVANCEMENT.

Finding (Assessment Source)	Goal	Obj.	Activity	Target Populations	Source of Funds	Service Providers	Related Agencies
Although about eighty percent (80%) of jobs in the immediate future will not require a baccalaureate degree, approximately 3 of 4 jobs in the immediate future will require some education/training beyond the secondary school. (I.B.12,13)	E	6	Support the refinement and expansion of coordination plans and cooperative arrangements amongst regular high schools, vocational-technical high schools, and community colleges. (SCOVE)	Students Grades 9-14	PL98-524	School Systems Community Colleges	Board of Regents of Higher Education
	E	6 7	Planning grants to establish comprehensive agreements including jointly operated programs; integrated curriculum (e.g. 2 plus 2 programs); advanced standing; and other elements of cooperation. (SCOVE)	Students Grades 9-14	PL98-524 Title 11B	Secondary Schools Community Colleges	Board of Regents of Higher Education
Successful partnerships amongst secondary schools, community colleges and employers have emerged in some locations of the state. (IV.B.1,3-6)	E	7	Support the development and expansion of partnership programs, especially those that serve adults who are unemployed or underemployed, including dislocated workers.	Adults	PL98-524 Title IIA	Voc-Tech Schools Community Colleges	Board of Regents of Higher Education Secretariats of Economic Affairs and Labor Division of Employment Security Industrial Services Program Massachusett Rehabilitation Commission

GOAL E: TO COORDINATE VOCATIONAL EDUCATION PROGRAMS AND SERVICES WITH OTHER PUBLIC AGENCIES AND THE PRIVATE SECTOR SO THAT RESIDENTS OF MASSACHUSETTS HAVE ACCESS TO THE FULL ARRAY OF SERVICES AVAILABLE

Finding (Assessment Source)	Goal	Obj.	Activity	Target Populations	Source of Funds	Service Providers	Related Agencies
	E	4	Provide information on all adult training and development programs in vocational-technical education to a variety of constituencies, especially to participants in adult literacy programs.	Adults		Voc-Tech Schools Community Colleges	Adult Education Community Organizations
			Sponsor regional based information exchanges.	Adults and Program Staff		Department of Education serves as Facilitator	Bureau of Adult Education Massachusetts Rehabilitation Commission
	E	7	Develop a publication that describes the community education practices that have contributed to effective and creative vocational education-business partnerships.	Vocational Educators Business Industry Labor	PL98-524	School Districts Community Colleges	Office of Community Education

GOAL E: TO COORDINATE VOCATIONAL EDUCATION PROGRAMS AND SERVICES WITH OTHER PUBLIC AGENCIES AND THE PRIVATE SECTOR SO THAT RESIDENTS OF MASSACHUSETTS HAVE ACCESS TO THE FULL ARRAY OF SERVICES AVAILABLE

Finding (Assessment Source)	Goal	Obj.	Activity	Target Populations	Source of Funds	Service Providers	Related Agencies
There is a need to create more public awareness of vocational education on a state, regional, and local level.	E	I	Design and disseminate a facts document on vocational education for distribution to the public, including state level policymakers.	Public	PL98-524	Department of Education	Providers of Vocational Education
(III.A. 2-4, 7,8-14) (III.B. 1,3,8,11)	C	1	Identify, validate, and publish information on promising practices in vocational education, including public awareness strategies.	Public School Staff	PL98-524	Providers of Vocational Education	Department of Education
	E	1	Create more community awareness of vocational education through student/teacher community projects.	Public		Teachers and Students	Office of Community Education
	E	9	Increase the use of advisory committee members to outreach to various community and civic groups.	Public		Advisory Committee Members	
There is a need for vocational education to share information and the demonstration of effective practices with the apprentice training system.	E	8	Identify elements of each system that could improve the programs and sponsor information exchange workshops that feature exemplary techers.	Enrollees and Staff in Vocational Education and Apprentice Training	PL98-524 Title IIB	School Districts Apprentice Training Programs	Building Trades Training Directors Association Division of Apprentice Training, State Department of Labor

GOAL A: TO ASSURE EQUAL ACCESS AND TO ASSURE EQUAL OPPORTUNITY FOR ALL STUDENTS TO SUCCEED IN VOCATIONAL EDUCATION.

GOAL E: TO COORDINATE VOCATIONAL EDUCATION PROGRAMS AND SERVICES WITH OTHER PUBLIC AGENCIES AND THE PRIVATE SECTOR SO THAT RESIDENTS OF MASSACHUSETTS HAVE ACCESS TO THE FULL ARRAY OF SERVICES AVAILABLE

Labor Market Conditions: Employment Needs

In order to improve the relevance of vocational skills training programs and to enhance graduates' chances for employment, the Division of Occupational Education restricts new program development to those occupations that demonstrate a high labor market demand (in terms of the number of projected job openings and/or projected rate of growth of the occupation). During fiscals years 1989-1990, service providers applying for P.L. 98-524 funds for new programs must document labor market demand in one of two ways: (a) the inclusion of the proposed new program on the Statewide Demand List or (b) through evidence provided by the Service Providers that there is local labor market demand in its area of the state for that occupation. In addition, quality of occupation factors must be evident prior to approval of a new program.

This section first describes the projected distribution of jobs by industry sector in Massachusetts for 1995. Then, a summary of projected job growth by occupational area is given. Finally, the Statewide Demand List, which identifies the occupational fields with high statewide labor demand, is presented.

Massachusetts' Labor Market Conditions 1984-1995

During the period 1984 to 1995, the Massachusetts economy is projected to generate over 450,000 new jobs, a growth rate of about 16%. In 1985, Massachusetts maintained the lowest unemployment rate of the 11 larger industrial states for the third consecutive year, and tied New Hampshire for the lowest unemployment rate in the nation. The vigor of Massachusetts' economy has been attributed in part to its diverse industrial structure and this diverse industrial structure is expected to continue to provide strong job opportunities throughout the Commonwealth during the next decade.

Employment Distribution by Sector: 1995

The pie chart illustrates the projected distribution of jobs across the seven industry sectors for 1995. As shown in this chart, the services sector will account for the largest share of all jobs (34.6%), followed by the wholesale and retail trade sector (23.6%), and the manufacturing sector (21.7%). Substantially smaller shares of the 1995 employment will be found in the finance, insurance, and real estate sector (6.3%), the transportation, communications, and utilities sector (4.7%), the government sector (5.4%), and the construction sector (3.7%).

SERVICE OCCUPATIONS are the second largest and second fastest growing occupational category in Massachusetts. The service occupations are expected to grow by 23% and to generate over 106,000 new jobs by 1995. Following are some of the fast-growing service jobs for which Massachusetts will offer skills training as part of a vocational-technical education program.

- Bakers - 820 new jobs and 25% growth rate
- Cooks/Chefs - 2,500 new jobs and 30% growth rate
- Institutional Food Workers - 1,160 new jobs and 13% growth rate
- Home Health Aides - 1,750 new jobs and 37% growth rate
- Medical Assistants - 1,070 new jobs and 62% growth rate
- Dental Assistants - 1,000 new jobs and 28% growth rate
- Child Care Workers - 1,440 new jobs and 30% growth rate

CRAFT AND KINDRED OCCUPATIONS include the construction and building trades; mechanics, repairers, and installers; and precision workers. Between 1984 and 1995, a total of 50,000 new jobs in the construction trades should be created, in large part due to large scale construction projections such as the Central Artery, Harbor Tunnel, Deer Island Treatment Center, and Fan Pier projects. Following are some of the widely-expanding building trades for which Massachusetts will offer skills training as part of a vocational-technical education program.

- Carpenters - 3,390 new jobs and 18% growth rate
- Bricklayers and Stone Masons - 560 new jobs and 21% growth rate
- Electrical Workers - 2,630 new jobs and 20% growth rate
- Painters and Paperhangers - 1,760 new jobs and 22% growth rate
- Plumbers and Pipefitters - 2,450 new jobs and 26% growth rate

The mechanics, repairers, and installers group of craft and kindred occupations should increase about as fast as the average rate for all occupations (16%). Some individual occupations in this group will increase at substantially higher rates. Following are some of the fast-growing occupations for which the Commonwealth offers as part of a vocational-technical education program.

- o Computer Service Technician - 3,390 new jobs and 101% growth
- o Automotive Mechanics - 4,020 new jobs and 21% growth
- o Business Machine Maintenance - 500 new jobs and 44% growth
- o Heating, Air Conditioning, and Refrigeration Mechanics - 1,190 new jobs and 22% growth.

PRODUCTION AND TRANSPORTATION OCCUPATIONS are projected to decline 4.5% by 1995, resulting in a loss of over 9,000 jobs. Two programs currently offered in the Commonwealth will be adversely affected by this decline.

- o Welders and Flamecutters - 370 <u>fewer</u> jobs and 5% <u>decrease</u>
- o Metal Machine Operators - 3,790 <u>fewer</u> jobs and 17% <u>decrease</u>.

One production and transportation occupation for which vocational-technical education institutions Massachusetts offer skills training, as part of an education program however, will experience growth:

- o Heavy Equipment Operators - 1,010 new jobs and 14% growth rate

Statewide Demand List

The Division of Occupational Education has developed a Statewide Demand List which identifies those skills training programs associated with occupations for which there is currently a high labor market demand statewide (according to the most recently available data from the Massachusetts Division of Employment Security). In addition, a program was included on this list only if: (a) the occupation requires less than baccalaureate level training, (b) the <u>number</u> of projected job openings are ample enough to accommodate the projected number of program completers (based on prior enrollment data) and (c) prior placement data indicates that program completers are likely to secure training-related jobs or to pursue further education.

During fiscal years 1989-1990, P.L. 98-524 funds for new programs may be used only for those programs on this Demand List or for other programs for which the service provider can provide adequate evidence that there is a local area or sub-state labor market demand. This latter option is provided to service providers in recognition of the fact that there is some diversity in Massachusetts' economy for different regions of the Commonwealth. Quality of occupation factors must be evident prior to approval of a new program. These factors include advancement opportunities, wage and benefit profile, and stability of employment potential. Advancement opportunites include self-employment.

The Division of Employment Security has created booklets that describe in detail the labor market projections for the 15 sub-state districts that conform to the Service Delivery Areas organized under the Job Training Partnership Act (JTPA).

STATEWIDE DEMAND LIST

Listed below are those occupations which require less than baccalaureate level training and which demonstrate a high labor market demand according to currently available data from the Massachusetts Division of Employment Security. The Department of Education restricts new program development to the occupations on this list, amendments to this list, or programs for which an eligible recipient documents sub-State labor market demand to the satisfaction of the Division of Occupational Education.

DISTRIBUTIVE OCCUPATIONS

040400	Finance and Credit
040800	General Merchandising
041700	Real Estate
041800	Recreation and Tourism

HEALTH OCCUPATIONS

070101	Dental Assisting
070102	Dental Hygiene
070103	Dental Laboratory Technology
070203	Medical Laboratory Technology
070301	Nursing (Associate Degree)
070302	Practical Nursing
070303	Nursing Assistant
070305	Surgical Technology
070501	Radiologic Technology
070503	Nuclear Medicine Technology
070903	Respiratory Therapist
070904	Medical Assistant
070906	Health Aide
079901	Medical Record Technology

CONSUMER AND HOMEMAKING

090203	Food Management, Production, and Service

(continued)

STATEWIDE DEMAND LIST
(continued)

OFFICE OCCUPATIONS

140100	Accounting and Computing
140201	Computer and Console Operator
140400	Information Communications
140700	Stenographic, Secretarial, and Related

TECHNOLOGY

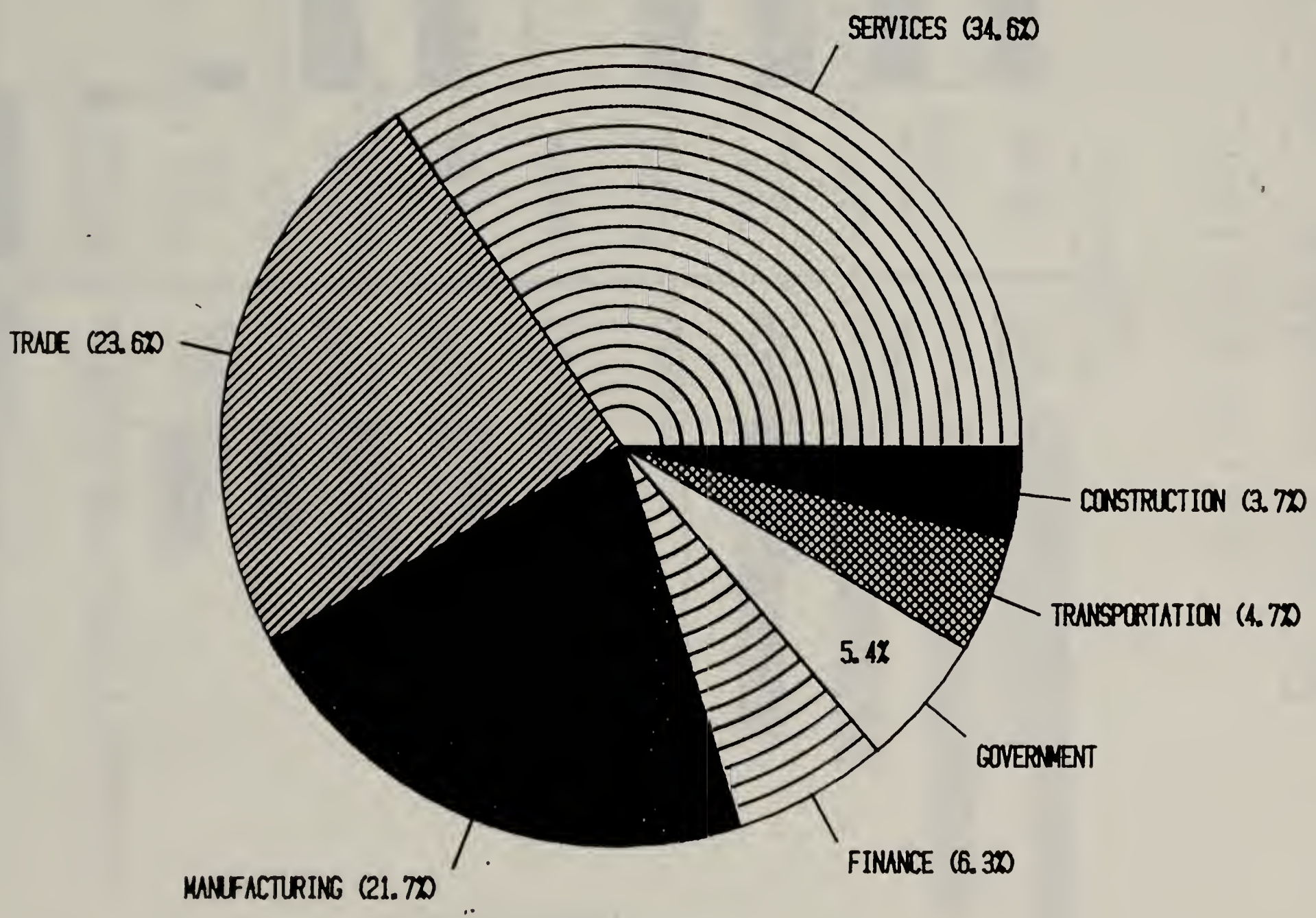
160108	Electronic Technology
160109	Computer Service Technician (Electromechanical Tech)
160113	Mechanical Technology
160401	Computer Programmer

TRADE AND INDUSTRY

170100	Heating, Ventilating, and Air Conditioning
170302	Automotive Mechanics
170600	Business Machine Maintenance
171001	Carpentry
171003	Heavy Equipment Operation and Maintenance
171004	Masonry
171007	Plumbing and Pipefitting
171099	Construction and Maintenance
171300	Drafting Occupations
171400	Electrical Occupations
171500	Electronic Occupations
171900	Graphic Communications Occupations
172900	Quantity Food Occupations
172901	Baking
172902	Cook/Chef

1995 EMPLOYMENT DISTRIBUTION

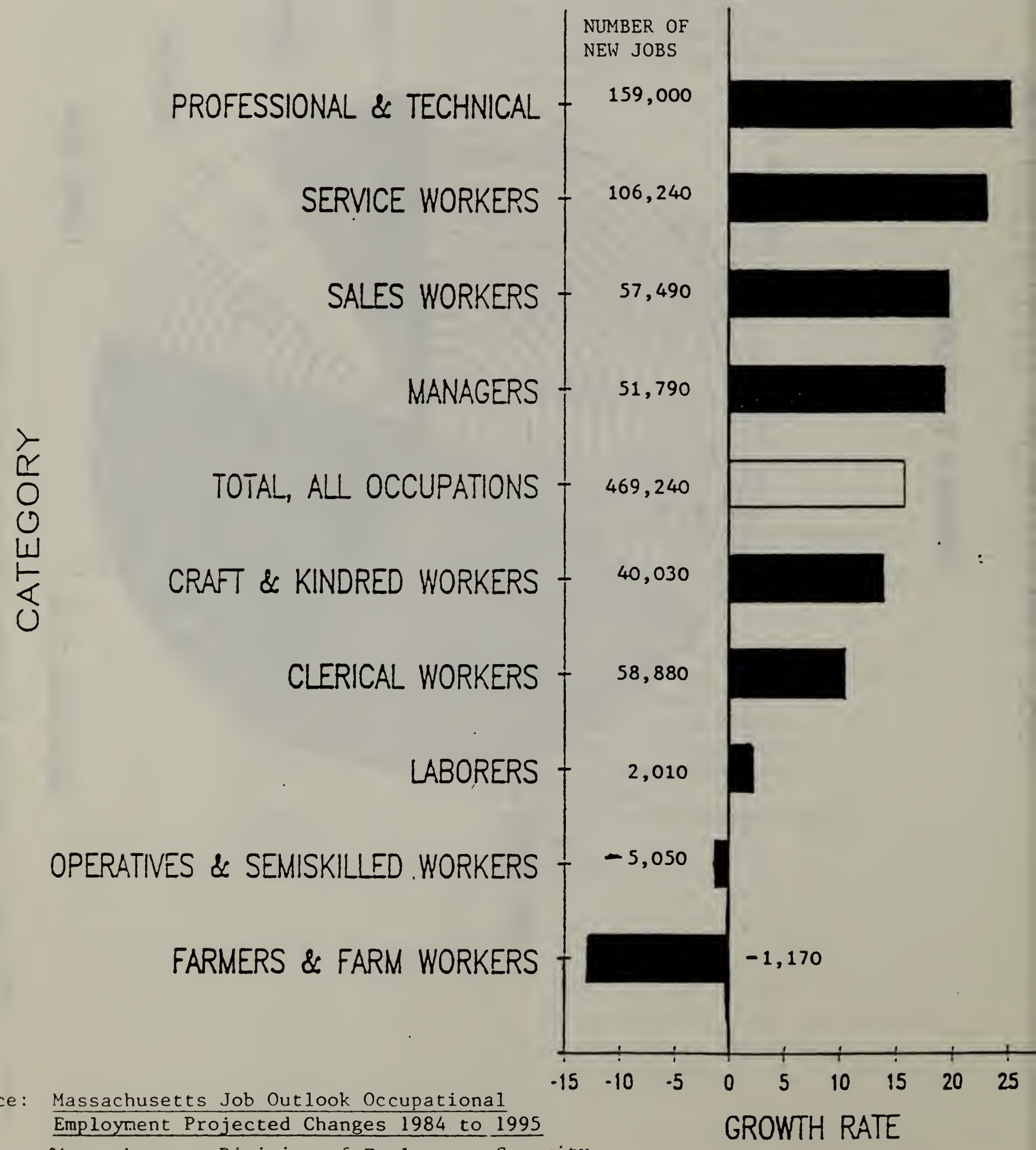
COMMONWEALTH OF MASSACHUSETTS



Source: Massachusetts Industrial Employment Projected Changes 1984-1995

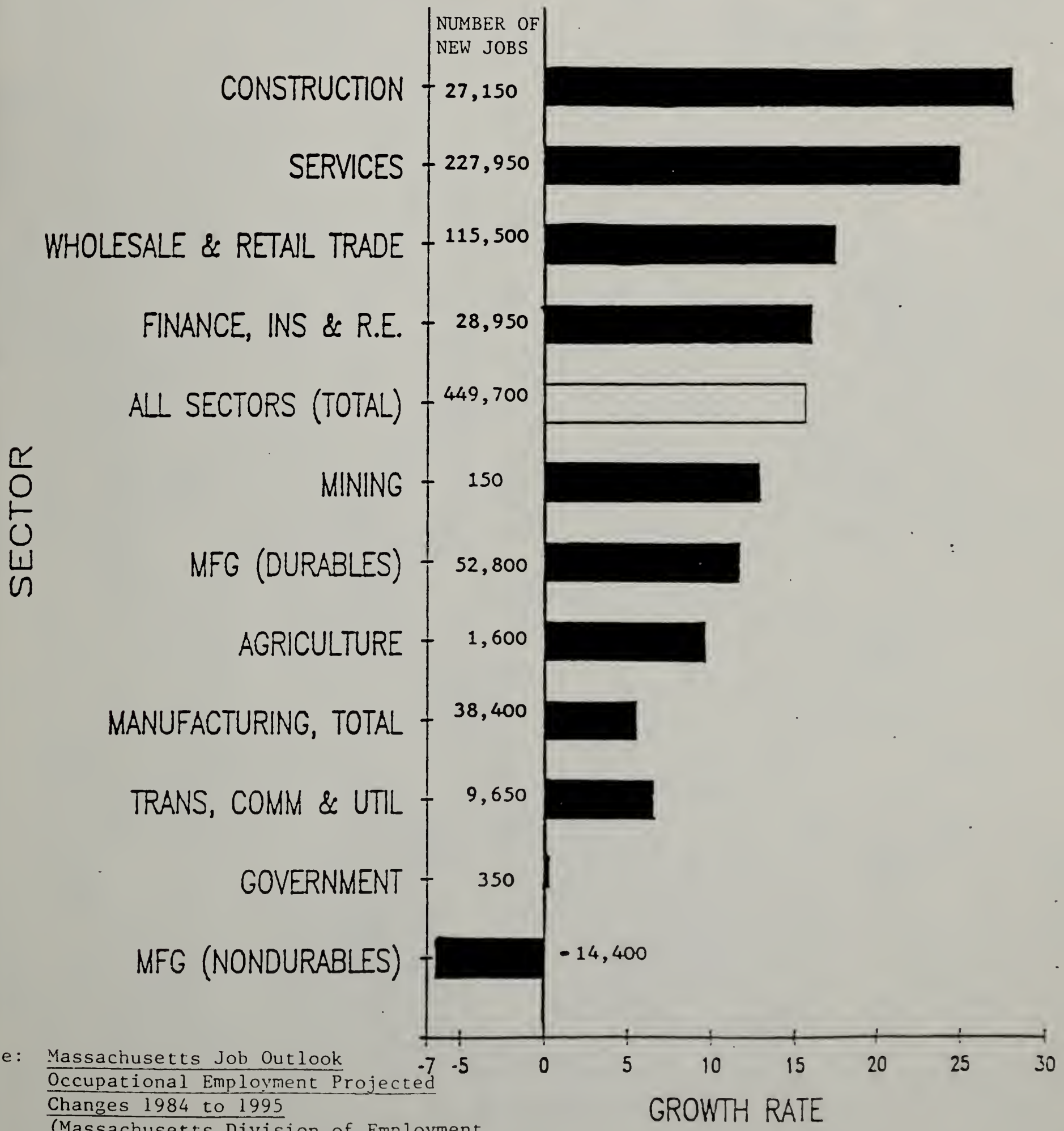
(Massachusetts Division of Employment Security, May, 1986).

PROJECTED JOB GROWTH BY OCCUPATIONAL CATEGORY 1984 - 1995



Source: Massachusetts Job Outlook Occupational Employment Projected Changes 1984 to 1995 (Massachusetts Division of Employment Security, January, 1987)

PROJECTED JOB GROWTH BY INDUSTRY SECTOR 1984 - 1995



Source: Massachusetts Job Outlook Occupational Employment Projected Changes 1984 to 1995 (Massachusetts Division of Employment Security, January, 1987)